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DEPARTMENT OF THE INTERIOR

HON. CHARLES STEWART, Minister

W. W. CORY, Deputy Minister

TOPOGRAPHICAL SURVEY OF CANADA

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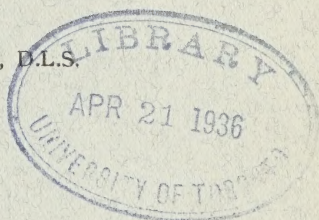
Report on an Exploratory Survey

BETWEEN

Great Slave Lake and Hudson Bay

Districts of Mackenzie and Keewatin


By J. W. TYRRELL, D.L.S.



Reprinted from the Annual Report of the Department of the Interior, 1901



OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1924



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PREFATORY NOTE

The material in this pamphlet was originally published as part of Appendix No. 26, Part III, Annual Report of the Department of the Interior, for the year 1901. In view of the demand for information concerning that part of Canada with which it deals, it was deemed advisable to reprint the main text and also the maps, now out of stock, which formerly accompanied it. These maps are issued in a separate holder as a supplement to this pamphlet.

E. DEVILLE,
Director General of Surveys.

OTTAWA, November, 1923.

REPORT OF J. W. TYRRELL, D.L.S., EXPLORATORY SURVEY
BETWEEN GREAT SLAVE LAKE AND HUDSON BAY, DISTRICTS
OF MACKENZIE AND KEEWATIN.

HAMILTON, ONT., August 30, 1901.

E. DEVILLE, Esq.,
Surveyor General,
Department of Interior,
Ottawa, Canada.

SIR,—Herewith I have the honour to submit the report of my exploratory survey of 1900, extending from Great Slave lake to Hudson bay, in the districts of Mackenzie and Keewatin.

INTRODUCTORY

In accordance with your instructions, dated January 20, 1900, I have made an exploration of the country between Great Slave lake and Hudson bay, in the districts of Mackenzie and Keewatin, and have now prepared a large map, comprising twenty-two sheets, 32 by 40 inches, on a scale of one inch to one statute mile, of the routes covered by our expedition.

In all seventeen hundred and twenty-nine miles of survey were accomplished, and in the performance of this, four thousand six hundred miles were travelled with sleds and canoes.

Two hundred photographs (5 by 7) were obtained along our route.

A large number of astronomical and magnetic observations were obtained. A complete meteorological record was kept throughout the journey. As complete a botanical collection as could be made in the barren grounds was obtained, and as far as possible notes were kept and specimens procured of the rock formations and minerals met with at various points. If indeed any part of your instructions has not been fully carried out, it has only been because of my inability to do more within the time devoted to the work, but I trust that my efforts may meet with your approval.

HISTORICAL

Before proceeding with the report of my own discoveries, I think it will be well to present a brief collection of such scattered fragments of information as have been available to me from the publications of earlier explorers, regarding the district of which information is required.

Several explorers have from time to time touched upon the area in question, and each one has contributed more or less of interest and value.

Some accounts are of interest because of their absurd inaccuracies, some because of their close approximation to what turns out to be fact, and others for various reasons of their own.

DISCOVERY OF CHESTERFIELD INLET

The earliest discovery of any part of our route seems to have been that of Chesterfield inlet, in the year 1747, by the officers of the *Dobbs* and *California*—two ships of 180 and 140 tons respectively, sent out from England in 1746 by the North-west Association for the discovery of the north-west passage. The officers reported "that they found an inlet in the latitude of 64° north and in the longitude of 32° east from Marble island which was three or four leagues wide at its entrance, but upon their sailing eight leagues up, it increased to six or seven leagues wide. That their course so far was N.N.W. by compass, but then it began to turn more to the westward; that sailing ten leagues higher it grew

narrower by degrees till it became but four leagues wide; that notwithstanding they could perceive shores open again, they were discouraged from proceeding further because the water from being salt, transparent, and deep with steep shores, and strong currents, grew fresher, thicker and shallower at that height.”*

From the above account it would appear that their discoveries of the inlet ascended to the neighbourhood of Centre island, though this is somewhat uncertain since their statements of distances are very inaccurate, the width of the inlet, for instance, as seen by them being at no place more than twelve miles wide instead of seven leagues (twenty-one miles).

CAPTAIN CHRISTOPHER

In the year 1761, Chesterfield inlet was again entered by Captain Christopher, who ascended it for a distance of 100 miles, when finding the waters becoming fresh he turned back.

The following year, he, with the sloop *Churchill*, accompanied by Mr. Norton in a cutter, returned to the inlet and ascended it to Baker lake, at the west end of which they saw the mouth of a river.

On Christopher's chart, opposite the mouth of this river these words are written: “A small river, full of falls and shoals, not water enough for a boat.”†

This note, it may be mentioned in passing, is very much at variance with the facts as now disclosed, and may be best explained by assuming that Christopher never saw the mouth of the Thelon or Doobaunt river, but got into the mouth of some smaller stream.

SAMUEL HEARNE

The next expedition, in order of time, affording any information regarding the region in question, were those famous journeys made by Samuel Hearne in the years 1769-70-71-72, the account of which was published by himself in 1795.

His narrative throughout is an exceedingly interesting one, although not noted for geographical accuracy. It is valuable further as an early history of a remote region of this country, and I will take the liberty of here quoting from his book certain parts having direct reference to portions of my route of exploration.

Writing of his third journey, page 87, Hearne says:—

“We still continued our course to the west and west by south and on the 8th of April (1771) arrived at a small lake called ‡Thelewey-aza-yeth, but with what propriety it is so called I cannot discover, for the meaning of Thelewey-aza-yeth is Little Fish Hill, probably so called from a high hill which stands on a long point near the west end of the lake.

“On an island in this lake we pitched our tents, and the Indians finding deer very numerous determined to stay here for some time in order to dry and pound meat to take with us, for they well knew by the season of the year, that the deer were then drawing out to the barren grounds, and as the Indians proposed to walk due north on leaving this lake it was uncertain when we should meet with any more.

“Agreeably to the Indians' proposal we remained at Thelewey-aza-yeth ten days, during which time my companions were busily employed (at their intervals from hunting) in preparing small staves of birch wood about 1½ inches square and 7 or 8 feet long. These serve as tent poles all the summer while on the barren grounds, and as the fall advances are converted into snow-shoe frames for winter use.

“Birch rind, together with timbers and other wood work for building canoes, were also another object of the Indians' attention while at this place, but as

* Report of Doobaunt, Kazan and Ferguson rivers, by J. Burr Tyrrell, Geo. Survey of Canada, 1896.

† Report of Doobaunt, Kazan and Ferguson rivers, by J. Burr Tyrrell, Geological Survey of Canada, 1896

‡ A lake on the upper portion of the Thelon river.

the canoes were not to be set up till our arrival at Clowey (which was many miles distant), all the wood work was reduced to its proper size for the purpose of making it light for carriage.

"As to myself I had little to do except to make a few observations for determining the latitude, bringing up my journal, and filling up my chart to the present time. I found the latitude of this place $61^{\circ} 30'$ north, and its longitude, by my account, 19° west of Prince of Wales Fort. Having a good stock of dried provisions and most of the necessary work for canoes all ready by the 18th, we moved about 9 or 10 miles to the north-north-west, and there came to a tent of Northern Indians who were tenting on the north side of Thelewey-aza-river.* From these Indians Matonabee purchased another wife.

"On the 23rd, as I hinted above, we began to move forward and to shape our course nearly north, but the weather was in general so hot, and so much snow had in consequence been melted, as made it bad walking in snow-shoes, and such exceeding heavy hauling, that it was the 3rd of May before we could arrive at Clowey—though the distance was not above eighty-five miles from Thelewey-aza-yeth.

"In our way we crossed part of two small lakes, called Tittameg lake and Scartack lake.

"The Lake Clowey is not much more than twelve miles broad in the widest part. A small river which runs into it on the west side is said by the Indians to join the "Athapuscow" lake.†

"Besides the Grand river, already mentioned, ‡there are several others of less note which empty themselves into the great Athapuscow lake.** There are also several small rivers and creeks on the northeast side of the lake, that carry off the superfluous waters, some of which, after a variety of windings through the barren grounds to the north of Churchill river, are lost in the marshes and low grounds, whilst others by means of many small channels and rivulets are discharged into other rivers and lakes, and at last, doubtless find their way into Hudson bay."††

Later in his narrative, Hearne says:

"From the 13th to the 24th of February we walked along a small river that empties itself into the Lake Clowey, near the part where we built canoes in May, one thousand seven hundred and seventy-one. This little river is that which we mentioned in the former part of this journal as having communicated with the Athapuscow lake; but from appearances, it is of no consequence whence it takes its rise, or where it empties itself, as one-half of it is nearly dry three-fourths of the year. The intervening ponds, however, having sufficient depth of water, are, we may suppose, favourable situations for beaver, as many of their houses are to be found in those parts.

"The little river lately mentioned, as well as the adjacent lakes and ponds, being well stocked with beavers, and the land abounding with moose and buffalo, we were induced to make but slow progress in our journey.

"Many days were spent in hunting, feasting and drying a large quantity of flesh to take with us, particularly that of the buffalo, for my companions knew by experience that a few days' walk to the eastward of our present situation would bring us to a part where we should not see any of those animals."

In connection with the present report, the following quotation from Hearne is, to my mind, of great interest since it undoubtedly refers to the valleys of the lower Thelon river. He is describing a remote Indian settlement from which a wandering band had come, and writes as follows:—

* One of the upper branches of Thelon river.

† Athapuscow lake is what we now know as Great Slave lake, and is separated from Clowey by the height of land.

‡ Slave river.

** Great Slave lake.

†† A remarkable example of imagination. In order to perform such a feat, the waters of Lake Athapuscow would have to cross an elevation of 800 feet.

"From the best accounts that I could collect, the latitude of this place must be about $63\frac{1}{2}^{\circ}$ or 63° at least; the longitude is very uncertain. From my own experience I can affirm that it is some hundreds of miles both from the seaside and the main woods to the westward.

"Few of the trading Northern Indians have visited this place, but those who have give a pleasing description of it, all agreeing that it is situated on the banks of a river which has communication with several fine lakes. As the current sets to the northeastward, it empties itself, in all probability, into some part of Hudson bay, and, from the latitude, no part seems more likely for this communication than Baker's lake, at the head of Chesterfield inlet. This, however, is mere conjecture, nor is it of any consequence as navigation on any of the rivers in those parts is not only impracticable, but would be also unprofitable, as they do not lead into a country that produces anything for trade, or that contains any inhabitants worth visiting.

"The accounts given of this place, and the manner of life of its inhabitants, would, if related at full length, fill a volume; let it suffice to observe that the situation is said to be remarkable for every kind of game that the barren grounds produce at the different seasons of the year, but the continuance of the game with them is in general, uncertain, except that of fish and partridges.

"That being the case, the few who compose this little commonwealth, are by long custom, and the constant example of their forefathers, possessed of a provident turn of mind, with a degree of frugality unknown to every other tribe of Indians in this country except the Esquimaux. Deer is said to visit this part of the country in astonishing numbers, both in spring and autumn, of which circumstance the inhabitants avail themselves by killing and drying as much of their flesh as possible, particularly in the fall of the year, so they are seldom in want of a good winter's stock. Geese, ducks and swans visit here in great plenty during their migration, both in the spring and fall, and by much art, joined to an unsurmountable patience, are caught in considerable numbers in snares, and without doubt make a *very* pleasing change of food. It is also reported, though I confess I doubt the truth of it, that a remarkable species of partridge, as large as English fowls, are found in that part of the country only."

Those, as well as the common partridge it is said, are killed in considerable numbers with snares, as well as with bows and arrows.

"The rivers and lakes near the little forest where the family above mentioned had fixed their abode, abounded with fine fish, particularly trout and barbel which are easily caught, the former with hooks, and the latter in nets. In fact, I have not seen or heard of any part of this country which seems to possess half the advantages requisite for a constant residence, that are ascribed to this little spot. The descendants, however, of the present inhabitants must in time evacuate it for want of wood, which is of so slow a growth in those regions, exclusive of what is cut down and carried away by the Esquimaux, must cost many years to replace. It may probably be thought strange that any part of a community, apparently so commodiously situated and happy within themselves should be found at so great a distance from the rest of their tribes, and indeed nothing but necessity could possibly have urged them to undertake a journey of so many hundred miles as they have done; but no situation is without its inconveniences, and as their woods contain no birch trees of sufficient size, or perhaps none of any size, this party had come so far to the westward to procure birch rind for making two canoes and some of the fungus that grows on the outside of the birch tree, which is used by all the Indians in those parts for tinder."

Until the present time, the whereabouts of this northern "Garden of Eden," so well described, though never visited, by Hearne, has been a matter of mystery.

No such productive valley or flourishing settlement has been known to exist in the barren lands, and Hearne's story has thus seemed but an Indian fable.

The investigations of the present expedition have, however, established both the existence and location of such an oasis, but, as predicted by Hearne, the primitive settlers have long since departed, although for some other reasons than lack of fuel. The writer's descriptions of the land of these early settlers will appear later in this report.

CAPTAIN DUNCAN

The next point of attack tending towards the exploration of our route was from the eastward, when in 1792, Captain Charles Duncan entered Chesterfield inlet, ascended to Baker lake and anchored at its western extremity in the mouth of the Thelon or Doobaunt river.

Thence "he followed the course of the river by land until he found it came from the northward, in which direction he traced it nearly thirty miles, when, being convinced that it must be the drain of some lake in that line, and not an outlet from the Doobaunt,* he returned, being satisfied that his following it further could not lead to any useful discovery. Had its course been from the westward, he would not have left it, he says, until he had seen its source."†

Had Captain Duncan pushed his investigations farther, he would have discovered that the river did come from the westward, and not only so but that through it the "Doobaunt" finds its outlet.

SIR GEORGE BACK

Coming down to the explorations of the past century, the first, and that furnishing most information in regard to the divide between Great Slave lake and Hudson bay, is that made by Sir George Back, during the years 1833-34-35, the winters of which he spent at Old Fort Reliance, a beautiful spot at the north-east extremity of Great Slave lake. His explorations extended over parts of Great Slave, Artillery, Clinton-Colden, and Aylmer lakes as well as the whole of Back's river, and from the Indians Back obtained some interesting information regarding the route followed by the writer.

The following notes and quotations are taken from "Captain Back's Arctic Land Expedition":—

He reports 4 feet of ice along the shore of Artillery lake on the 15th of June, 1834, and having travelled over it with his sleds on that date. Under date of the 19th of June, on Clinton-Colden lake, he mentions the ice as becoming treacherous and rotten in places, and covered by new snow. Nevertheless he was able to continue his sled journey across Aylmer lake on June the 26th, and on the Back river until July 2nd, after which he was able to travel by boat in open water.

In making his first trip out to Artillery and Clinton-Colden lakes, Back travelled by way of the Hoarfrost river, but on his return to winter quarters at Fort Reliance in the autumn, he made an attempt to descend the "Ah-nel-dezeth"—Lockhart river, and thus describes his adventures.

"The river by which it (Artillery lake) discharges itself into Great Slave lake, began its descent by an ugly rapid, too hazardous to run and yet scarcely so dangerous as to induce us to make a portage of. We compromised, therefore, by lowering half the way and carrying the rest. A second rapid was run, but we had not calculated on the amazing force of so confined a torrent, and just as we gained the eddy, the old canoe gave a twist which nearly broke it in two. Another clump of pines induced me to land, and while the men examined the quality of the timber, I obtained a set of sights, which gave the latitude 62° 53' 26" N., longitude 108° 28' 24" west and variation 38° 42' east.

† Report of Doobaunt, Kazan and Ferguson rivers, by J. Burr Tyrrell, Geological Survey of Canada, 1896.

* A large lake discovered by Hearne.

"The wood was in no way better than that seen in the early part of the morning, and we pushed from the bank with the intention of going carefully down the stream, though a look of indecision, if not of positive apprehension, betokened some inward working in the steersman's mind, for which I was utterly unable to account, until informed that for days past Mawfelley had been talking about the dangers he did know and the dangers he did not know in the Ah-hel-dessy. The Indians, he said, never attempted it in any manner, either up or down, and as he was not in a hurry to die, though he was willing to walk on the rocks, he would not on any account run it in the canoe. I shamed him out of this unmanly resolution, and when he and his companion had indulged in a laugh among themselves, we slipped down another rapid. However, on trying the fourth, the steersman became so unnerved as to lose all self-command, and by not co-operating with De Charlôit, fixed us against a sharp rock that cut the canoe.

"Happily it twirled around and floated till we reached the shore. The man's confidence was gone, and rather than incur any more such risk in the foaming rapids before us, I abandoned an attempt which the Indian persisted in declaring was impossible, and the trusty and battered canoe being left with a few other things in cache, each man was laden with a weight of one hundred and twenty pounds, and began to pick his way up the steep and irregular sides of the hills.

"I took leave, therefore, of the Ah-hel-dessy and had abundant cause to rejoice at having done so, for the whole distance to the mountain appeared to be an unbroken succession of rapids, which must have stopped us, for whether passable or not in a boat, they were evidently impractical in a canoe.

"We had expected that our route would have been by a small river about a mile to the eastward, invariably used by the Chippewyans or Yellowknives, whenever they proceeded in that direction, and as it may be supposed, quite unknown to me until that moment. On subsequent inspection, however, it was found to be too shallow for canoes, being merely the outlet of some small lakes, and the waters of a picturesque fall from four to eight feet distant. There were many small Indian canoes, stowed under the branches of the willows, and as it was the lowest and most favourable route to the barren lands, it was preferred, it seems, to those by which I had passed."

Leaving Fort Reliance on June 7 of the following year, and portaging across to Artillery lake, Back writes as follows:—

"Taking a northerly direction through the woods, we soon got into a succession of swamps, then ascended steep rocks, and subsequently gained a sight of the Ah-hel-dessy, which seems in that part to be navigable, though from the noise was certain a heavy fall* was not far distant.

"We passed many sand-hills variegated by the arbutus plant, called by the traders 'Sac-a-commis,' 'Cranbury,' or 'Crowberry.' These hills were generally hemmed in by broken cliffs of red feldspar and barren granite rocks, with here and there thick masses of snow filling up their chasms, or sloping from the lower parts of vertical precipices. A few old tracks of deer were seen.

"Acclivitous rocks intervened between the swamps, and in going over their summits, the Ah-hel-dessy was frequently seen working its rapid course along the base of the mountain range which sometimes assumed the wildest character. The space from the spot where I had left the canoe last year to the first rapid out of Artillery lake was quite open, and immense quantities of ice were floating down the stream.

"The temperature was full 10 degrees colder than at the house; large masses of ice and snow encumbered the banks or borders of the rocks, and the ice on the lake had not decayed nearly so much as was observed at the same season of the year in 1821 at Point lake, more than two degrees to the north.

* Parry's falls.

" In the evening we reached the bay, and found that the carpenters had just completed the boats At 3.30 a.m. of June 10, the large boat was dragged about three-quarters of a mile through a half dry swamp, and over some rocks to Artillery lake, where she was placed firmly on runners plated with iron and drawn over the ice by two men and six fine dogs. . . .

"The runners appeared to slide easily, and for half an hour a brisk pace was kept up. By degrees, however, it slackened on account of the badness of the ice, which was literally a bed of angular spikes, of many shapes and sizes, but all so sharp as to make walking a most painful and laborious operation."

Upon his return journey, after exploring the Back river, Sir George writes as follows:—

"About noon of the 24th (September) we got to the Ah-hel-dessy, where we were greeted by the sight of berries. . . . The descent of this small but abominable river was a succession of running rapids, making portages, and lowering down cascades, and much time was occupied in previous examination, without which precaution we dared not stir a yard. Still the rapids increased in number and difficulty, until at last a deep and perpendicular fall* rushing between mountainous rocks into a vast chasm stopped all further progress. The steersman, unwilling to be arrested even by such obstacles, went some distance farther, but soon returned with an account of more falls and cascades.

"To convey the boat over so rugged and mountainous a country, most of the declivities of which were coated with thin ice, and the whole hidden with snow, so as to render mere walking difficult enough, was obviously impossible; and though it was annoying to be forced to leave her, yet as there was no alternative, she was safely hauled up among some willows and secured.

"Each of the crew being laden with a piece weighing 75 pounds, we began our march to the Fort across the mountains now entirely covered with snow four inches deep. The small lakes and swamps were also frozen hard enough to bear a passage across."

PARRY'S FALLS

"We had not proceeded more than six or seven miles when, observing the spray rising from another fall, we were induced to visit it, and were well consoled for having left the boat where she was.

"From the only point at which the greater part of it was visible, we could distinguish the river coming sharp round a rock, and falling into an upper basin almost concealed by intervening rocks, whence it broke in one vast sheet into a chasm between four and five hundred feet deep, yet in appearance so narrow that we fancied we could almost step across it. Out of this the spray rose in misty columns, several hundred feet above our heads, but as it was impossible to see the main fall from the side on which we were, in the following spring I paid a second visit to it, approaching from the western bank. The road to it which I travelled in snow-shoes, was fatiguing in the extreme, and scarcely less dangerous, for to say nothing of the steep ascents, fissures in the rocks, and deep snow in the valleys, we had sometimes to creep along the narrow shelves of precipices, slippery with the frozen mist that fell on them. But it was a sight which well repaid any risk. My first impression was of a strong resemblance to an iceberg in Smurenvurg Harbour, Spitzbergen. The whole face of the rocks forming the chasm was entirely coated with blue, green and white ice, in thousands of pendent icicles, and there were, moreover, caverns, fissures and overhanging ledges in all imaginable variety of forms, so curious and beautiful as to surpass anything of which I had ever heard or read. The immediate approach was extremely hazardous, nor could we obtain a perfect view of the lower fall, in consequence of the projection of the western

Harvey's falls, 50 feet high.

cliffs. At the lowest position which we were able to attain we were still more than one hundred feet above the level of the bed of the river beneath, and this instead of being narrow enough to step across, as it had seemed from the opposite height, was found to be at least two hundred feet wide.

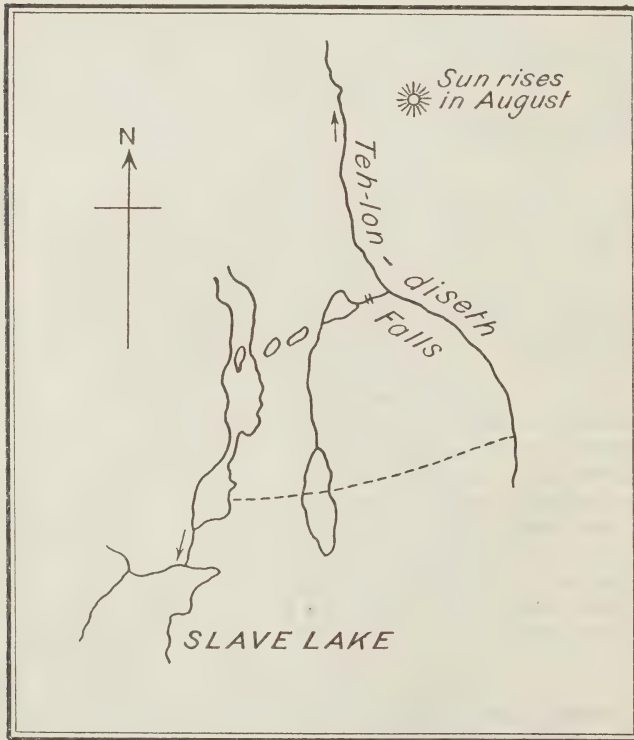
"The colour of the water varied from a very light to a very dark green, and the spray, which spread a dimness above, was thrown up in clouds of light gray. Niagara, Wilberforce Falls in Hood's river, the Falls of Kakabikka, near Lake Superior, the Swiss or Italian falls, although they may each "charm the eye with dread," are not to be compared to this for splendour of effect.

"It was the most imposing spectacle I had ever witnessed, and as its berg-like appearance brought to mind associations of another scene, I bestowed upon it the name of our celebrated navigator, Sir Edward Parry, and called it "Parry's Falls." "*"

Besides the above personal knowledge published by Back, concerning the Ah-hel-dessy and Artillery lake, he gives us some information gleaned from the Indians, regarding the Thelon river and route to the same.

The following is a copy of an Indian sketch map made for him, illustrating routes from Great Slave lake to Teh-lon-diseth.†

FAC-SIMILE
OF
INDIAN MAP
TAKEN FROM
BACK'S BOOK, PAGE 85.



* These truly picturesque little falls are worthy of note, but how Back obtained his dimensions I am at a loss to discover. The total measured height of the falls is eighty-three feet, and width from twenty to fifty feet. Photographs were obtained by me from both banks.

† Thelon river.

In connection with this subject, Back says, in describing an interview with a party of Slave lake Indians, whose chief was named "Le camarade de Mandeville," the information thus collected was made intelligible to me by means of an outline of the north-eastern country, drawn by the Camarade.

"In this sketch the Thlew-ee-choh and Teh-lon were represented as maintaining a nearly parallel direction E. N. E. to the sea, though where that sea was, whether in some of the deep inlets of Hudson bay or as I fervently hoped, more directly north towards Point Turnagain, it was altogether beyond his knowledge to declare.

"In one point alone were they positive and unanimous, and that was, the superiority and many advantages of the Teh-lon over the Thlew-ee-choh. The former was described as being a broad and noble stream, decorated on either bank with tall pine and birch, and flowing in uninterrupted tranquillity to its journey's end. . . .

"They also affirmed, agreeing in this respect with the information which had previously been given me at Lake Winnipeg, that the distance between the mouths of the rivers was inconsiderable, and concluded by saying that if the great chief was determined on going to the Thlew-ee-choh, it would be without an escort of Indians.

". . . . 'And why,' said they, 'should the chief wish to go there when the Teh-lon is not only nearer, but affords him so many more advantages, where he will find musk ox, moose, and reindeer, wood, fish and animals wherewith to pass a comfortable winter?'"

In passing through Clinton-Colden lake, Back states that "east and west it was indented with deep inlets and bays." One of them to the right, presenting a clear horizon, led, as Mawfelly believed, to the Teh-lon.

"Subsequently several Indians who had been there, informed me that by making a portage from the eastern extremity of a deep bay, they got to a small lake and from thence by another portage to a large one; that this discharged itself by a river into the north-east end of a very long but narrow lake, the southern termination of which was about half way between that point and Slave lake.

"To the east they said it was connected by a short line of rapids, with a lake of singular shape, which, by means of a river seventeen miles long, communicated with the Teh-lon at a mean distance from our position of about eighty miles. As to the course of the principal river itself, little seemed to be accurately known, for the Indians never penetrate far, perhaps not more than twenty miles, beyond the part which has just been described. Then it was said to maintain a uniform direction towards the north-east."

These statements, moreover, corroborated the previous opinions given me of the Teh-lon, which was said to flow through a low marshy tract, connected with an estuary, opening to the sea by a narrow channel, the shores of which were lined by Esquimaux.

Any indication of the existence of the Teh-lon or Thelon river on our old maps have been derived from the above Indian descriptions collected by Back.

DR. JOHN RAE

During the year 1853, when searching for traces of the ill-fated Franklin expedition, Dr. John Rae added somewhat to our geographical knowledge of Chesterfield inlet, and more especially of Quoich river, which he ascended some distance in the hope of being able to cross to the Back river.

STEWART AND ANDERSON

Stewart and Anderson, in 1856, retraced much of the ground covered by Back, but beyond the information quoted above, there remained as recently as 1893, an area of over two hundred thousand square miles entirely unknown.

WARBURTON PIKE

Hence we read, page 170, of "The Barren Grounds" by Warburton Pike, 1892:—

"Why has all exploration in the barren grounds ceased? No more is known of the country than was discovered by Franklin and Back sixty years ago in their short summer journeys, and the expeditions sent out in search of the former in the fifties. There are many thousands of square miles on which the foot of white man has never stepped."

Upon his return journey from the Back river in 1890, Pike obtained the following information from an Indian, known as "Pierre the Fool," in regard to the country to the eastward of Clinton-Colden lake:—"He told us that there were fewer lakes in that direction than in any other part of the barren grounds that he had visited, but he was always obliged to take a small canoe with him to cross a big stream running in a southerly direction, three days easy travel from Clinton-Colden lake.

"Once when he had pushed out farther than usual, he had seen smoke in the distance, and came upon a camp that the Esquimaux from Hudson bay had just left; they had been cutting wood for their sleighs in a clump of well grown pines, and Pierre, who shared the dread which every Yellow Knife has of the coast tribes, had been afraid to follow them." From his own observations, Pike further writes:—"Lockhart river, on leaving Artillery lake, becomes a wild torrent, falling several hundred feet in twenty miles and is quite useless for navigation, so we had to make use of a chain of lakes, eight in number, lying to the south of the stream.

"This is by far the prettiest part of the country that I saw in the north, and it was looking its best under the bright sunshine that continued until we reached the fort. Scattered timber, spruce and birch clothed the sloping banks down to the sandy shores of the lakes; berries of many kinds grew in profusion; the portages were short and down hill; and caribou were walking the ridges and swimming the lakes in every direction. A perfect northern fairyland it was, and it seemed hard to believe that winter and want could ever penetrate here."

J. BURR TYRRELL

No sooner had Pike given expression to his query: "Why has all exploration in the barren grounds ceased?" than the work was resumed by the Geological Survey Department, and J. Burr Tyrrell, accompanied by the writer, was commissioned to explore the territory to the north-east of Lake Athabasca. This work was carried on during the years 1893 and 1894, and has been fully reported in the Annual Report of Geological Survey of Canada, 1896, so that without quoting extracts, it will suffice to state that the unexplored territory of over two hundred thousand square miles west of Hudson bay, was in those two years reduced by more than one-half, viz., from the valley of the Doobaunt river to the coast of Hudson bay. The country lying to the west of the Doobaunt, and comprising an area of about ninety thousand miles, remained shrouded in mystery.

OUR JOURNEY OUT

Arrangements having been completed for our expedition, on January 31, 1900, I was joined by my two assistants, C. C. Fairchild, O.L.S., of Simcoe, Ont., and Archdeacon Lofthouse, formerly of Fort Churchill, Hudson bay, and we proceeded to the west. At Winnipeg we picked up two half-breed voyageurs, named Robert Bear and John Kipling, from the St. Peter's reserve; and as train dogs were reported scarce in the north country, eight of them were also procured here, shipped to Edmonton, where we ourselves arrived at 11.30 on the night of February 8, in a temperature of 45° below zero.

At Edmonton we were joined by three more of our men, Percy Acres, cook, and Pierre French and Harry Monette, expert Iroquois canoemen.

We thus far formed a party of eight in all, with as many dogs.

On account of severe weather and recent heavy snow storms, some difficulty was experienced in securing horse teams for the transport of our outfit to Lac-la-Biche post, one hundred and eighty miles distant to the northward, at the termination of the tote road.

Two men with the dog teams and light sleds, were despatched by themselves, but the rest of our party, accompanied by two horse teams, were unable to get off until February 16. We reached Lac-la-Biche on the evening of the 21st. Here, in order to provide for the transport of our outfit, three additional dog teams were required, and these were procured for me by Mr. Kennedy, the Hudson's Bay Company's local agent. We were thus provided with five dog teams in all, one being very poor, having just made a journey of five or six hundred miles from the north, and on the 26th we pulled out, heavily loaded from Lac-la-Biche, and journeyed northward by a winding hilly trail through the woods, a distance of two hundred and fifty-five miles, to Fort McMurray at the junction of the Clearwater and Athabasca rivers.

Thence the course of the latter stream was followed one hundred and seventy-five miles down to Fort Chippewyan on Lake Athabasca. Great difficulty was experienced by the way in procuring food for our many hungry dogs. At one place we were obliged to stop two dogs whilst an Indian was despatched some distance for the carcasses of two moose which he had cached. At another the carcass of an unfortunate horse was required to sustain our canine steeds, and at another time a dead ox belonging to the Hudson's Bay Co. supplied the pressing demand, but as a rule frozen fish, purchased from the Indians at extortionate prices, furnished their bill of fare.

By the time, therefore, that Chippewyan was reached, our dogs were much reduced and fagged, and a stop of four days was necessary to feed and recruit them, to say nothing of men's blistered feet and snow-blind eyes.

One voyageur being required to complete our party, a Chippewyan Indian, known as "Toura," and a splendid specimen of physical manhood, was engaged at this place.

Much benefited by the pleasant stop at Chippewyan, where we fell in with many friends, we again moved forward on March 23. On the 26th reached Fort Smith, and on "All Fools day," trooped into Fort Resolution, Great Slave lake, having tramped a distance of six hundred and seventy-six miles from Lac-la-Biche, or eight hundred and fifty-six from Edmonton. Not counting necessary delays, en route, our average daily travel with the dogs from Lac-la-Biche to Resolution amounted to twenty-six miles.

At Fort Resolution we were kindly received by Mr. Gaudette, the Hudson's Bay Company's officer in charge at the post, and in his storehouse we found our supplies, amounting in weight to over six thousand pounds, which had been shipped the previous summer. Although you had written to the company requesting that our supplies be forwarded by boat up the lake, such request had not been received by Mr. Gaudette until too late for the performance of the work, and consequently the task of transporting this large amount of stuff now devolved upon us. Three more teams in addition to our own five were with some difficulty procured for the work. Two specially designed long steel shod sleds were constructed, and in order to provide food for the dogs, en route, a fishery was established part way up the lake at White island. Whilst the above preparations were being carried out, the snow on the lake, which had been deep, was rapidly disappearing before the warm sun and April showers, and by the 10th of the month it was thought that the condition of the lake was about at its best for travel.

Accordingly on the morning of the 11th, I despatched a party with light sleds and 3,500 pounds of goods to White island, where they were to deposit three loads, and returning bring back news of the fishery. This news was, unfortunately, not encouraging. A few large "inconnu," commonly known as "conneys," were caught by the nets, when these became entangled by the disruption of the ice in that locality. We were thus dependent for dog food upon what could be carried from Resolution or what might by chance be picked up by the way. Accordingly every available pound of dog food at the fort was secured, and the last of our loads set off for White island on April 16, on long sleds, each carrying from nine hundred to one thousand pounds. For the most part the condition of the lake was fairly good for sled travel. The snow had now nearly all melted, leaving ponds of water on the lake, and in places the ice was already becoming "canded," making sore footing for both men and dogs. As we proceeded this became serious, and though it was thought a sufficient supply of moose skin dog shoes had been provided, they were cut through so quickly, that our stock became exhausted before the distance up the lake was half covered.

Bags and every available material had to be manufactured into dog shoes in order to enable the poor brutes to keep their feet, for as we advanced the ice became in many places a veritable bed of sharp spikes.

Fortunately we were better provided ourselves with hob-nailed shoes, as nothing less will stand the wear for half a day. Our sleds were also designedly well shod with steel.

Without dwelling further upon the details of this sled journey of two hundred and fifty miles over the ice of Great Slave lake, suffice it to say that the last of our outfit was safely landed on "Pike's Portage" at the extremity of the lake on May 9, by a lot of starving but faithful dogs. Some had played out altogether and dropped by the way, but the two long sleds drawn by four dogs only, made the latter part of the journey with fifteen hundred pounds each. Were it not for these sleds, which were at first laughed at by the natives, we would never have been able to effect the transport of our outfit so great a distance with but the one base of supplies.

We were now at the point from which our surveys were to commence. Before us lay a twenty-five mile succession of portages to Artillery lake, and this I had hoped to be able to cross by the aid of the dogs. Such was now quite impossible for two very good reasons, viz., that the dogs were played out and we had nothing with which to feed them. Deer hunting parties were at once sent off in different directions, but no deer could be found. And again, further transport by the dogs was out of the question, for the reason that the snow had all disappeared from the ground, leaving the portages quite bare. On the lakes the ice was still about seven feet thick, excepting at certain parts where exposed to influence of currents, which were rapidly cutting inroads, and thinning the ice at such places.

The assistance of our dogs thus being no further available, they were sent back in charge of Mr. McKinley, to be cared for at Resolution until our return in the autumn.

Mr. Fairchild, accompanied by Acres, made a reconnaissance of the portage route to Artillery lake, and marked out the trail for the packers, whilst I proceeded forthwith to make a survey of the most easterly bay of Great Slave lake—named by me "Charlton harbour."

CHARLTON HARBOUR

This harbour extends in a northeasterly and southwesterly direction, and is about sixteen miles in length by from two to five miles in width. It is connected with McLeod's bay by a narrow but deep channel, less than a mile in width,

where the water seldom, if ever, freezes over, there being considerable current. Northeast and southwest of the channel, two long and high points of dolomitic limestone stretch out towards each other from the main shores and thus separate the harbour from the outer bay. A convenient way of approach for sleds or small boats from the lake to Old Fort Reliance—which is situated at the head of the harbour close to the mouth of the Lockhart river—is by means of a 700-yard portage, near the base of the northeasterly point, to which I have attached the name of my assistant, “Fairchild.” Fairchild point, which is about ten miles in length, is well wooded with white spruce from six to twelve inches in diameter, and is notable as being the best source of timber in that locality.

The shores of the harbour on all sides, excepting around Fort Reliance, are bold and rocky, that to the southeast being composed chiefly of pink granite, but sparingly wooded with small spruce and a few Banksian pines. It might be noted here that on Fairchild point a few black poplars were observed, the last seen on our outward journey.

At Pike’s portage, which was to be adopted as the initial point of our survey, astronomical as well as magnetic observations were taken with the following results:—

Latitude.	62°	42′	02″.4 N.
Longitude.	108	44	55
Magnetic Variation.	37	20	E.
“ Dip.	N.

OLD FORT RELIANCE

At Old Fort Reliance the magnetic variation was ascertained to be 37° 15′ east, Back having found it to be 35° 19′ east in 1834.

Old Fort Reliance is no more a fort, but a ruin, yet the site is one of the loveliest spots I have ever seen in the north. It was well chosen by Back for the establishment of his winter quarters. Five stone chimneys only now remain of what were 66 years ago three substantial buildings, the bare outlines of which can now be scarcely traced on the ground.

They were situated on a lovely level green terrace about twenty feet above the harbour, and two hundred feet from the shore. The main building which contained three of the great chimneys and five open fire places, measured thirty by fifty feet, and was divided into five rooms with a fireplace in each room.

Two smaller buildings, 18 feet square, and situated a little to one side, appear to have completed the fort.

Back of the buildings the land rises in regular and beautiful terraces to a considerable elevation. These are thinly wooded with young white spruce trees, between which in many places the ground is covered with cranberries and blueberries. Here and there are to be seen the charred remains of large stumps, indicating the comparatively recent destruction of the original forest, as well as offering an explanation for the disappearance of the old fort.

The largest young trees, which showed 34 or 35 years’ growth, were from four to six inches in diameter two feet from the ground, and were not of stunted appearance.

One of the most striking features of this lovely natural park is the occurrence of numerous broad, winding, well-beaten roadways, leading from nowhere to nowhere.

Upon inspection, not a wheel nor even shoe mark can be detected, but only innumerable tracks of the caribou, occasionally followed by that of a prowling timber wolf.

About one of Back’s old stone chimneys, an adventurer known as Buffalo Jones built a small log house three or four years ago. This still remains, being now the property of Messrs. Heslopp and Nagle, of Fort Resolution, and was occupied by my party for several days.

PARRY FALLS

Closely associated with the history of this place is that of Lockhart river and its many beautiful cataracts, chief among which is Parry falls, depicted by Back as being the most beautiful in the world. Having read Back's description of them, I had long been looking forward to viewing their marvelous grandeur and beauty, and took occasion to read the description to Mr. Fairchild, who undertook a tramp up the Lockhart in search of deer upon our first arrival. He ascended the river for ten or eleven miles, passing several rapids and falls, but on his return reported that no Parry falls were to be found. Shortly afterwards, accompanied by Messrs. Fairchild and Lofthouse, in making a survey of the river, I renewed the search myself, and at the place indicated on Back's map, found Parry falls, and obtained several photographs of them which will speak for themselves in plain ungarbled language.

The fall is certainly a very beautiful little one—something as described by Back, excepting in dimensions, which require to be divided by five in order to be correct.

The total descent of the fall is eighty-three feet, and at the time of our visit was completely bridged over by an ice-bridge, across which we walked, in order to obtain views from both banks, as well as to measure the width of the fall, which at that place was only twenty-five feet.

Besides Parry falls, five others ranging from six to fifty feet in height occur at various points further up the river, but as they are all shown upon my accompanying map, it is not necessary to describe them in further detail, since the Lockhart will never be used as a navigable stream, it having in its length of about twenty-four miles a total fall of six hundred and sixty-eight feet. If not of use for purposes of navigation, however, it may some day prove none the less valuable for the generation of electric power to be utilized in the development of the district, or in conducting traffic through it. As a town site, no place could be more beautifully or advantageously situated than the level park-like terraces, at Fort Reliance.

PIKE'S PORTAGE

During the time occupied in surveying Charlton harbour and the Lockhart river, my voyageurs were engaged in transporting our outfit across the "Pike Portage" route to Artillery lake, a distance of twenty-four miles.

This route first described by Warburton Pike, is by far the best canoe or boat route leading from Great Slave lake to Artillery lake.

It does not appear to have been known to Back in the thirties, when he persistently made three laborious journeys up and down the course of the Lockhart. Back mentions an alternative route by way of a small creek one mile southeasterly from Reliance, but states that this creek was too shallow for canoes, which is quite true.

By adopting Pike's route, advantage is taken of a chain of small lakes—eight in number—which cover more than three-fourths of the twenty-four miles of travel.

For convenience of reference the larger of these lakes have been given the following names in the order of our advance:—1, Harry; 2, French; 3, Acres; 4, Kipling; 5, Burr; and 6, Toura, after the names of our voyageurs.

The only difficult portage on the route is the first in ascending order, viz., that from Charlton harbour to Lake Harry. It is $3\frac{1}{4}$ miles long, and from end to end has an ascent of 570 feet, besides several ascents and descents on the way. Lake Harry is three miles long and is separated from French lake, which is ten feet lower in elevation, by a portage of four hundred yards.

French lake is over four miles in length, and discharges to the northeastward into Acres lake, which is six feet lower. A short portage of one hundred yards is necessary between the lakes.

Acres lake, which is of very irregular shape, is the largest of the chain, though its length is only about four miles. It has an elevation of 1,074 feet, and discharges from one of its westerly bays by a stream, which I believe to be the one entering Charlton harbour, about a mile southeasterly from Fort Reliance.

Kipling lake—the fourth link in the chain—discharges into Acres lake with which it is connected by a narrow, winding, sluggish creek, navigable for canoes. It is only two and one half miles in length, but is one of the prettiest lakes of the series, its beautifully wooded shores and sandy beaches sloping down gradually to the water's edge in many places. Thus far the country passed through was found to be fairly well wooded with small white spruce and tamarack; whilst on the first long portage a grove of jack pines—the last seen by us—was passed. Some small white birch trees were also noticed at various points. By May 19 we had our outfit of about three tons weight, in cache at the north end of Kipling lake. The body of the lakes was still covered by ice, but around the shores and for half a mile or so near the inlets and outlets, open water had already formed, and this was causing our voyageurs much care and trouble, for the ice near the edges of the open water, was for some distance treacherous and rotten. Canoes and sleds had to be used alternately in crossing the lakes, and much care and difficulty were often necessary in making the transfer from one conveyance to the other.

From lake to lake, the ground being bare, all goods had of course to be portaged on the men's backs.

Many old Indian camps were to be seen along our route, indicating that it is a much frequented way, but up to this time we had seen no deer. Their tracks were, however, to be seen everywhere, as well as many scattered bones and antlers.

One party of Indians, "Pierre Fort Smith" and several others, had passed us on their way to Artillery lake, whence they were going to hunt deer, and later in the season, musk oxen.

From the north end of Kipling lake, a portage of one thousand yards easterly, took us to a pond which is separated only by a narrow neck from Burr lake, the fifth of the series. This lake is in a straight line not more than twelve miles distant from Old Fort Reliance, with which it is connected by a natural pass having a gradual descent to the westward. It does not afford a favourable canoe route, since it contains few lakes of any size, and too small a stream to be of any service, but as a route for a highway, steam, or electric railway it appears to be the most advantageous, and since the elevation of Burr lake is 1,131 feet, the mean gradient from the lower terrace at Reliance would be fifty feet to the mile.

At the north end of Burr lake there is situated a nice grove of white spruce timber, containing trees of ten and twelve inches diameter. A photograph of this was fortunately obtained, as it proved to be the last timber of any consequence met with before entering the barren lands, excepting some on the west shore of Artillery lake near Timber bay.

The portage from the north end of Burr lake to Toura lake is three-quarters of a mile long, and may be made either in one or two parts, by avoiding or taking advantage of a little lake lying to the east of the straight course. The seventh lake of the chain, which is nearly a mile in length, is reached by a very short portage from Toura lake, and is at an elevation of twelve hundred and eighty-two feet, being at the summit of the divide between Great Slave and Artillery lakes. From it a portage of seven hundred yards to the eastward takes one to the eighth and last lake, which is less than half a mile in length, and one more down hill portage of a quarter of a mile in length lands one at the southern extremity of Artillery lake, so named, though but crudely surveyed, by Sir George Back, after some British artillery men of

his party. In addition to the portage route above described, which was followed by our voyageurs, several others were discovered by myself and Mr. Fairchild, and are shown on my accompanying maps, but will not require further description. The district is composed of granite and dolomitic rocky hills, some of which attain elevations of from nine hundred to one thousand feet above the level of Great Slave lake.

The distance from Reliance to the southern extremity of Artillery lake in a straight line is about sixteen miles. The elevation of Artillery lake is 1,188 feet, or 668 feet above Slave lake, which would make a mean gradient of about forty-two feet per mile.

ARTILLERY LAKE

Artillery lake was reached by our outfit on the 26th of May, more than two weeks after it had been first visited by Fairchild and Acres, when exploring and "brushing" the trail for our voyageurs. Then its ice had been as solid as in winter, showing no signs of disruption or decay, whereas now it was rapidly decomposing, forming what is known as candle-ice, and making much open water along the shores. At camp beside a small grove of scrubby trees a mile and a half up the west shore of the lake, observations were taken of latitude and longitude, as indeed had been done at several other points, but as the results of both astronomical and magnetic observations appear on the maps, and will be given elsewhere in tabulated form, they will not always be mentioned in manuscript.

I had cause, however, to congratulate myself for having obtained sights at this place, for the next day I allowed my chronometer to run down, and had only to return a short distance, obtain new sights and redetermine their errors. The first deer met with on our journey were two shot by Mr. Fairchild near this camp, and they formed a most acceptable supply of fresh meat for our party.

In attempting to proceed with our loaded sleds up the lake, we came very near meeting with a serious accident. Although the ice was still of considerable thickness, it had become so "candled" that in places one could push a pole or foot completely through it, and at one of these bad places, two of our sleds broke through and were only saved by the support of the long canoes which were lashed on top of the loads.

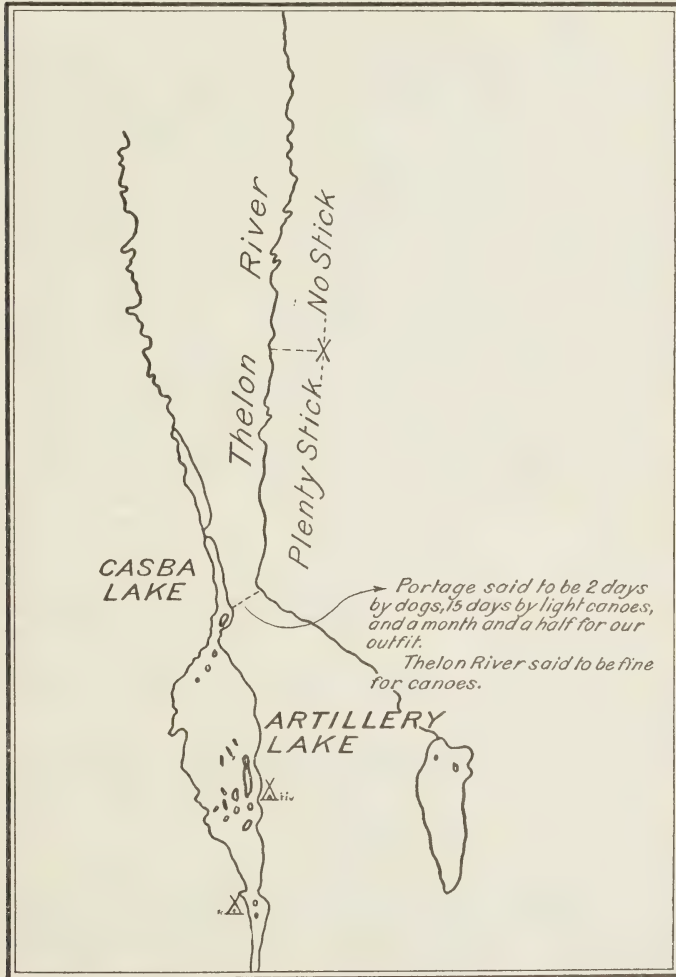
By the exercise of much care, and the occasional use of canoes, instead of sleds, we were able to continue our transport over the ice until June 8, when reaching the most northerly grove of timber on the east shore of the lake, in latitude 63° 04' 10" I decided to go into camp until we might be able to proceed in our canoes. We had met the Indian "Pierre Fort Smith," on the lake, who had not only told us of this advantageous camping place, but also much else of interest in regard to our route and the game of the country. The annexed little map is a fac-simile of one drawn by him of Artillery lake and the Thelon river, and is better of the lake than Back's published map.

Thus far with Mr. Fairchild's assistance I had carried on the survey of both shores of the lake, and now though we were unable to proceed further with our loads, we were still able to travel light, and so continue our work until we had nearly completed the survey of the lake, as well as considerable country to the eastward of it. The uncompleted portion of the north end was finished on my return later in the season.

Artillery lake lies in a northeasterly and southwesterly direction, and is fifty-five miles in length by seven miles in width at the widest part which is towards the north end. The southerly end terminates in a long narrow bay, less than half a mile in length, and the superficial area of the lake is about one hundred and ninety square miles. Its shores are bold and high, in some places about two hundred feet above the lake, and for the most part they present a bare, desolate appearance, especially on the easterly shore where few trees of any kind can be seen.

Such small groves as were found are shown on the map, but on the westerly side, about ten miles from the south end, the shore is quite well timbered with small spruce, and they continue northerly, although thinly scattered for a distance of twenty miles, eight miles farther north than the last grove on the east shore. There the woods cease entirely, and beyond the landscape is indeed a

SKETCH MAP
OF
ARTILLERY LAKE AND THELON RIVER
MADE BY
PIERRE FORT SMITH
MAY 31st 1900



picture of desolation, although it produces much grass, mosses and other vegetable life for the support of the numerous bands of caribou which rove its rocky hills. About half way up the lake there is a group of high rocky islands, the largest of which, named "Crystal island," lies towards the east main shore, and appears from Back's map to have been taken by him for a part of it.

Its length is about five miles and its width half a mile. It is composed chiefly—as also the smaller islands—of dolomitic limestone with some patches of white quartz conglomerate, and innumerable white quartz stringers everywhere through the limestone. In these stringers in many places were found clusters of small clear quartz crystals, and hence the island's name.

Some growing timber was found on the south end of the island, as well as a large quantity of standing charred trees, making the place a most desirable camping ground. Similar rocks to those of Crystal island are found also on the east shore opposite, and southerly to a point opposite the head of the Lockhart river, where the formation changes to a coarse-grained red granite.

The west shore near the south end, which is precipitous in places, and attains a height of two hundred feet, is also composed of granite and diorite, together with large quantities of hematite ore. Dolomite and granite are found at many points on the lake, and in some cases contain a considerable amount of iron pyrites.

The easterly shore of the lake is the more regular and unbroken, as well as being nearly in line with the most direct route across the grand divide.

The resources of Artillery lake and vicinity, outside of any mineral wealth it may possess, lie in its fisheries, its furs and meat supplies. In regard to the fisheries, I can testify that its deep cold waters abound with the finest specimens of lake trout as well as whitefish, pike and carp. At one place in about fifteen minutes, with a single spoon hook, one of my men pulled out eighteen fine trout, some of which were brought to camp, strung on a pole and photographed by me. Some of these fish were from sixteen to twenty pounds in weight. In regard to the fish of Artillery lake, I was told a most astonishing story by the Indian "Pierre Fort Smith," and his companion. They affirm that they have frequently seen fish from twenty to thirty feet long in the water, and described them as being of black colour, with long slender horns or feelers. They say that they have never killed one of them—being afraid of them—but that they are frequently seen in the deep waters when crossing the lake. When I smiled at their story with some expression of doubt, they became very indignant and with one accord stoutly declared every word of it to be true.

I offered them "one hundred skins" if they would capture or kill such a fish for me, but they only said they could not do so, they were too big, and they were afraid of them.

The fur-bearing animals of the district are black bears, timber wolves, carcajous or wolverines, coloured foxes and ermines, although musk oxen are also found at no great distance from Artillery lake, both to the northeast and northwest.

The meat supply of the country, which is abundant, is furnished chiefly by the caribou.

Water fowls are not numerous as the rocky shores and deep water are not such as to provide feed for water fowls, but ptarmigan are quite plentiful on the land, where they find abundant varieties of berries which are found everywhere.

HEIGHT OF LAND

During the interval of our encampment in the last woods on the east shore of Artillery lake, advantage was taken of the opportunity for making a track survey across country towards the height of land, which was thought to be no very great distance to the eastward.

On June 11, therefore, accompanied by Mr. Fairchild and three voyageurs, I proceeded by canoe, northeasterly along the shore through a channel of open water for a distance of twenty miles where a deep land-locked bay was discovered, which appeared to be the most easterly arm of the lake, and thus to afford the most advantageous point from which to start on our overland journey.

From the east shore of this bay on the following morning our tramp was commenced, and a mean astronomical course of north 80° east followed.

The character of the country passed over was that of bare rocky hills, with occasional high sand ridges, and with grassy valleys between them.

The rocks were observed to be granites and gneisses, and many deer were everywhere to be seen moving northward. The slope of the land was found to be to the westward for a distance of seven miles, when suddenly from the summit of a hill—the elevation of which was 1,488 feet—a large lake, one hundred and fifty feet below us, was discovered. It appeared to extend for miles to the northward, having from our elevation a water horizon in that direction. It also stretched for a considerable distance towards the south, and as its surface was now only partially covered by ice, our further progress to the eastward was most effectually obstructed.

From our elevation a fine view of the lake and surrounding country was obtained, and many conspicuous white sand hills and ridges were visible in various parts. As to the direction of discharge from this lake, we were at first unable to determine the question, but upon surveying the west shore, a distance of ten miles to the southern extremity and finding no outlet there, but several small inlets, and subsequently on completing the survey of the northeast shore of Artillery lake, and finding no stream which could form the outlet of so large a lake, it became evident that the outlet must be to the north or eastward, and that we had consequently crossed the Grand divide at the distance of about seven miles from Artillery lake—the elevation being, as already stated, 1,488 feet. This new discovery was named by me "Douglas lake," after my own little boy.

In returning to camp, Mr. Fairchild and the men had some difficulty in getting the canoe back along the shore, as the ice had drifted in tight upon some of the points. As for myself, I walked all the way back to camp across the country—a distance of about twenty-five miles—in order to explore the district.

Many small lakes and ponds were met with, and the rocks were observed to be granite and gneiss in most places.

Glacial striæ were observed on the rocks with a strike of north 88° east (astronomical).

Little else of interest was to be noted, beyond the fact that I had a rough, tiresome tramp, and reached camp in good time to save myself from getting a thorough soaking. Mr. Fairchild and party did not reach camp with the canoe until 11.30 p.m., some two hours later than myself.

Preparatory to proceeding on our journey with the canoes a small "cache" of provisions and such other articles as would not be necessary on the Barren lands, such as our sheet iron stove, was placed and securely fastened high up between two small trees, from which the branches and bark were then removed, so that the trees might be smooth and as difficult for carcajous to climb as they could be made.

The carcajou, it may be mentioned, is one of the most troublesome enemies to the Indian or the hunter. It is almost impossible to make anything secure from the reach of this robber brute. What he cannot eat he will destroy, or carry away and hide, and as he is not only very powerful and cunning, but can climb trees, or swim in the water, he is indeed a formidable enemy. Notwithstanding our carefully built "cache" my Indians said the carcajou would rob it, so as a last resort, I nailed a lot of great strong fish hooks upon the barked trees, and thus left it to take its chances of safety. On the afternoon of June 18, the lake ice being off shore sufficiently, we loaded our entire outfit into the canoes for the first time, and with some difficulty worked our way along shore to the northeastward. At certain prominent points where the ice was close in upon the shore we had to make portages over the ice, which was now none too strong for such work.

However, on the morning of the 21st we reached the head of Artillery lake and entered the mouth of "Casba" river, a Chippewyan Indian name, the equivalent of White Partridge river. This river which is only about ten miles long, discharges the water of Aylmer, Clinton-Colden and Casba lakes, and has a total fall of thirty-two feet. Towards its upper end are three rapids, necessitating, on the upward trip, three portages of 250, 250 and 400 yards respectively. On the down trip, the two upper rapids may be run by canoes, and only the lower 250-yard portage made where there is a fall of 15 feet.

Just above the third rapid Casba lake is reached. It is about 15 miles long, by from two to three miles wide, excepting at the south end where a deep bay extends towards the north-west for a distance of nearly four miles.

As far as this bay we were accompanied by "Pierre Fort Smith" and his friends, who in that direction were now setting off on a musk ox hunt.

Casba lake was found to be comparatively free from ice, and this was an agreeable surprise to us since we had left so much ice to the south of us.

Having had the misfortune to lose the spinner of my canoe log on our second day out, I found myself seriously handicapped for want of a measuring instrument. Being wind-bound for half a day, however, I got to work and out of an aluminum fry-pan, manufactured a new spinner which proved to be quite as good as the one I had lost.

Casba lake is connected with Clinton-Colden by only a few hundred yards of current—nothing in the shape of a rapid or fall—and on entering this latter lake we saw the last of the ice on our outward journey. For three miles on Clinton-Colden lake we sailed in a north-easterly direction until we reached the entrance to a deep bay, in the mouth of which, as marked on the Indian maps made both for Back and myself, is a small island. Into this bay, which extends in a south-easterly direction, we turned our canoes and paddled a distance of only three and a half miles, when we found ourselves at its head, and, as we believed, at the commencement of the portage route to the "Thelon" as described by Back. As it was Saturday evening when we reached this place, "Sunday camp" was pitched, and the next day a reconnaissance made to the country to the eastward.

A portage of only 100 yards took us to a little lake about one mile long at the east end of which the height of land was crossed; at this point the elevation being only 1,234 feet above the sea.

At the portages we discovered some very old moss-grown fragments of tepee poles, proving that at some time the route had been travelled by Indians.

Since leaving the cache in Artillery lake, we had not seen a growing tree of any description other than a few ground willows. Moss and heather formed the only fuel supply of the country, and with these we boiled our tea, and did our necessary cooking.

The weather was at this time fine and pleasantly warm, ranging from 50° to 70° in the shade, and the mosquitoes were out in full force.

The character of the country was much less broken and rugged than about Artillery lake, its surface more level and containing few conspicuous elevations. The most notable perhaps from the height of land portage is a small conical butte bearing south 42° west by compass, and is probably the same one mentioned by Pike as a "leading mark" to the Casba river.

HEIGHT OF LAND LAKES

After crossing the divide, and within a mile and one-half therefrom, we entered a lake bearing away towards the south-east. This lake was named Lac Deville, in honour of our worthy surveyor general. It has an elevation of 1,206 feet, and was found to be about eight miles in length.

From the south-easterly extremity it discharges through two short rapids, when two portages of one hundred and four hundred yards respectively are necessary, into a second lake of four feet lower elevation. This lake I have taken the liberty of naming Smart lake, and through the north end of it we passed for a distance of nine miles. To the south, however, extended a deep bay into which we had no time to enter. That in all probability leads to the main body of the lake extending many miles to the south, as indicated on Back's Indian map. Smart lake outlets to the north-east by means of a rapid half a mile long, and a mile or two more of current, which enters the south arm of Sifton lake—so named in honour of the Minister of the Interior. Sifton lake has an elevation of 1,177 feet, and is of very irregular form, being composed of four large arms, one extending to the south, two to the north, and one to the east and south-east. Judging from the description this is the second large lake shown on Back's Indian map of the route of the Thelon, and such being the case our route lay by way of its eastern arm.

Whilst sailing northward into Sifton lake we encountered a gale which drove us ashore at the focus of the four arms. Thus finding a little leisure time thrust upon us, Mr. Fairchild and I, providing ourselves with compasses and field glasses, made an exploratory tramp of a few miles. The season had now advanced to June 27, and at such time in our latitude ($63^{\circ} 44'$) we had no darkness, although the sun dipped below the horizon for a short time. The hours of night were, therefore, as suitable for travel as those of the day, and hence it was 10 p.m. when, scanning the valleys and hillsides with my powerful stereoscopic field glasses, I observed a band of musk oxen feeding a mile or more to the northward. Fifteen of them were counted in all, and this was a genuine surprise, since we had not expected to see any of these animals for some time to come. They were none the less welcome, for our camp was much in need of fresh meat, and stimulated by this knowledge we procured two rifles from camp and set off in one of the canoes with two Indians, on a midnight hunt. The lake had now become quite calm, and the northern sky a glow of lurid light, making the scene a most enchanting picture, such as can only be seen within the shadow of the Arctic. For three miles our light canoe glided over the glassy surface of the lake in perfect silence, excepting for the faint ripple of the water against its sides, until when near the shore there suddenly appeared over the adjoining ridge, the huge black forms of nine musk oxen.

Even our breathing was now almost stifled until we were able to gain the shore and conceal ourselves from view behind the steep bank of the lake.

After hauling out the canoe upon a sand beach and carefully examining our rifles, we made the ascent of the bank. There we lay for some minutes in silent admiration within sixty yards of the foremost brute, in order to regain our breath and steady our nerves, which being accomplished, and the two largest bulls selected, at a given word, we both fired.

They were all taken completely by surprise and at once stricken with panic, and yet they had not yet located their source of danger, and knew not which way to flee. The succeeding ten minutes were assuredly most interesting around "Musk Ox hill."

Although our rifles were of the most modern and very powerful, one "soft nose" was by no means sufficient to bring the bulls to earth. We had to spring to our feet, and defend ourselves from the charge of several of the infuriated band, which were, however, soon despatched before our deadly missiles. One of the large bulls killed was found, upon examination, to contain six mortal wounds, and three holes through his heart, all of which he had received before falling. Such was found to be the tenacity of these noble beasts.

A young wounded musk ox which charged upon one of my men, and made matters decidedly lively for a time, was photographed by me before he fell at

1 o'clock a.m. He had previously been snapped by Mr. Fairchild, as the brute was charging upon him, but the light was not sufficient at that hour for an instantaneous photograph, and nothing resulted.

The whole night had passed without thought of sleep, but we had had a successful hunt, and were now well stocked with fresh meat.

On the summit of Musk Ox hill—seventy feet in height—a great cairn of rocks was built, and the geographical position of the spot determined.

Its latitude was found to be $63^{\circ} 44' 42''$, and longitude $108^{\circ} 17' 11''$.

The combined length of the south and east arms of Sifton lake by our course was found to be eighteen miles. How far the two northern arms extend, I cannot say, more than that they had water horizons from our points of view.

It is worth noting that at the head of a small bay about one mile east of Musk Ox hill, a few small scrubby spruce trees were observed. They were the first seen since leaving Artillery lake, but were too small to be of much interest.

On a small island in the southeastern arm of the lake we made our second cache of provisions, to be picked up on our return journey. On this occasion, having no trees, our provisions were merely placed in waterproof bags and covered over with stones, the isolation of the little island being relied upon chiefly for security. On this island some little local magnetic variation was observed—there being a difference of 3° between its two sides not one hundred yards apart.

From Sifton lake, a succession of small lakes and strong currents led us eight or nine miles to the southeast, bringing us back to the latitude of Smart and Casba lakes.

Thence we turned northeastward and eastward, passing through several small lakes having irregular and deeply indented shores.

The elevation of the upper of these lakes was ascertained to be about 1,190 feet, and the next ten feet lower.

Lac-du-Bois, so named from the occurrence on its shores of a few thinly scattered spruce trees, has an elevation of 1,148 feet.

On July 1, the water on these lakes was found to have a temperature at the surface of 60° , that of the air at the same time being as high as 72° , which to us felt excessively warm.

The above three lakes are connected by two heavy rapids of ten and thirty feet fall respectively.

At the upper one where a single tree was found, the portage, which is best made on the north side of the stream, is five hundred yards in length. At the lower rapid, though the fall is greater the portage is but four hundred yards long, and is on the south side of the stream.

Lac-du-Bois may be entered by either of the channels, but the southerly is the course of the main stream and contains a strong current.

It discharges by means of a wild rapid of 45 feet fall, when a portage of seven-eighths of a mile is necessary on the southwest side of the river.

HANBURY RIVER

At the foot of this rapid, a little lake two miles long was entered, and at its south end we found a discharging stream, which hereafter assumed more the character of a river, and to it I have attached the name of "Hanbury," after David T. Hanbury, the first white man to ascend it.

For about one mile and a half from the lake, the river trends nearly south and consists of one long rapid, falling in that distance about 50 feet. About two-thirds of the rapid may be run by canoe, but the remaining third is too rough and has to be portaged.

At the foot of this long rapid, the river bends to the northeast, and without describing its course in detail, continues in that general direction for about 50

miles, passing through four small lakes and into a fifth, which has been named "Sandy lake," because of the very remarkable and high white sand hills to the north of it, and its white sand shores and bottom. The elevation of Sandy lake is 940 feet, its length about four miles, and width less than one mile. Its waters are very shallow and full of sand bars. The general character of the river thus far afforded a fine canoe route, the current ranging from one to five miles an hour, with a mean velocity of probably three and a half miles. Just before entering Sandy lake, it turns sharply towards the southeast and maintains that general direction to its junction with the "Thelon."

About a mile below Sandy lake, the wildest section of Hanbury river commences. It begins with a beautiful fall of 50 feet, which I have named Macdonald falls. Thence for three miles down stream the river rushes through a narrow deep chasm, which I have named Dickson canyon, and falls a distance of over two hundred feet.

The scenery on this canyon is by far the wildest and grandest met with on our journey, not even excepting Parry falls.

If, therefore, Sir George Back's opinion of the magnificence of Parry falls is worth anything, what must be the grandeur of the Dickson canyon!

At Macdonald falls a portage of five hundred yards is necessary, and is best made on the left or east side. At the canyon a two-mile portage is necessary, and is best on the right or west side. About one mile below the canyon another fall of sixty feet occurs. This one I have named Ford falls, and it was passed by making a half mile portage on the right bank.

A much shorter portage would have sufficed had we been able to descend the river bank when the falls were passed, but this was not possible on account of the banks being high precipitous walls of sandstone.

At the head of the canyon the rock formation was observed to be gneiss, having a strike nearly due north (astronomical) and a dip of 75° towards the west.

Towards the foot of the canyon the formation changes to a soft, white coarse-grained sandstone, in which towards the bed of the stream are many large well-rounded "pot holes."

With the change of rock formation a well marked change in the character of the country and its vegetation was also noted.

About the many lakes, forming the head waters of the Hanbury river, the country was of a very barren appearance, with scarcely a growing tree until Lac-du-Bois was reached. Thence to the canyon, occasional groves of small spruce trees had been met with along the river banks, but below the canyon the country assumed a more verdant appearance. Broad, grassy low lands, affording luxuriant feeding grounds for musk oxen, began to make their appearance, whilst the occurrence of trees became more common. Many new variations of flowering plants were also collected below the canyon for the first time.

Ten miles below the canyon, another beautiful fall of 60 feet occurs, and this I have named Helen falls. A portage of 500 yards is necessary here, and a short distance below another fall of ten feet, and portage of 70 yards complete the list on the Hanbury river.

About eight miles more of fine smooth river, took us to the forks or junction with the "Thelon."

The Hanbury river and upper lakes as a whole, form an excellent canoe route from Clinton-Colden lake across the grand divide and down to the Thelon river. The whole distance across our winding route measured 165 miles, or in a straight course between the extreme points determined by astronomical observations, 87 miles.

From Fort Reliance to the junction of Hanbury and Thelon rivers, the straight line distance is 150 miles, and by our route, 280 miles. The two extreme points are almost of exactly the same elevation, that of Great Slave

lake being 520 feet, and that of the junction of the rivers being 530 feet, as nearly as could be determined from my barometric readings.

The intervening country is composed of bare rocky hills, and intervening stony low lands and lakes of great variety of form and size. Nothing of a mountainous character was found in the "divide" country, and the greatest elevation to be crossed was the height of land, distant 115 miles from Great Slave lake and 714 feet above it.

Between the height of land and the Thelon river there are in all fifteen portages, aggregating a total length of five and three-quarters miles, the longest one being two miles, the shortest fifty yards, and the average for the whole, 676 yards.

Besides these there are between Great Slave lake and the height of land, twelve portages, making an aggregate of six miles, the longest being three and a quarter miles and the shortest 100 yards.

The total number of portages, therefore, between Great Slave lake and the Thelon river is twenty-seven, and their total length eleven and three-quarter miles.

In regard to game on the Hanbury river and headwater lakes, comparatively little was met with, excepting about twenty musk oxen and a few broods of young geese.

The deer had all preceded us to the northward, only an occasional straggler, which had been unable to keep up with the herd remaining.

THELON RIVER

This fine stream was reached by us on the morning of July 7, about mid-summer. No snow or ice was anywhere to be seen, and the river had apparently fallen to somewhere near low water mark.

Opposite the first grove of spruce, about two miles below the junction of the Hanbury river, where we made camp, some measurements of the Thelon were made, from which the volume of flow at the time was found to be over 50,000 cubic feet per second. The width of the stream measured 1,227 feet, depth of channel five feet, and velocity three and one-third miles an hour. These measurements being taken near the forks, show a less depth but greater width than exists at most parts.

Eight miles farther down stream soundings were taken, showing a depth of fourteen feet in mid-channel. At this point well grown spruce trees were plentiful on both banks.

About twelve miles below the forks the channel becomes greatly contracted, and when descending the river has the appearance from a distance, of being quite obstructed by bluffs of sandstone, 400 feet in height. Upon nearer approach, however, a gap is observed through which the river passes without falls or rapids, contrary to one's expectations. The "Gap" being passed the river at once widens out beyond its usual width, and is confined by low sandy banks. Three miles below the "Gap" the stream is divided during high water, by a large low island, which I have named "Grassy island," because of the rank growth of grass covering it, upon which musk oxen were observed to be feeding. At times of low water the western channel is almost or entirely dry. Soundings at several places showed eleven and twelve feet of water in the channel, but at other places sand bars were found to exist where the water was not more than three feet in depth.

About thirty and thirty-two miles below the forks, two slight rapids occur where ridges of rock project into the stream, but they are so slight as not to seriously interfere with navigation of the river, either by canoes or large river boats.

Here, and for many miles below, the Thelon is a really fine and beautiful river, having grassy banks—well wooded in places by spruce trees—some of which measured fifteen inches in diameter.

GAME, ETC.

As we glided along and quietly down the river, one of the most interesting features met with was the occurrence of numerous bands of musk oxen feeding upon the luxuriant grass or sleeping on the river bank. Attempts were made to obtain photographs of some of these noble brutes, but such were not very successful, for two reasons, first, because of the wariness of the animals, and second, because of the weariness of the photographers.

It was observed that when bands of cows with their young were met with, they were usually very timid and fled at first approach of danger, but in the case of straggling bulls which were frequently seen, they were much more fearless and allowed us to approach as closely as prudence and their defiant attitudes would permit. One occasion, when Mr. Fairchild climbed the river bank in order to photograph a fine specimen, he had no sooner snapped his camera and turned his back, than the brute charged and followed him to the bank. He was at once covered by our rifles, but as Fairchild stepped safely into his canoe no shots were fired. Indeed, day after day we passed numbers of musk oxen, without molesting them in any way other than trying to photograph them. A notable fact in regard to the musk oxen was that every animal seen, with but one exception, was on the north side of the Thelon, or on islands in the river. On one occasion when three musk oxen were met with upon an island, they immediately plunged into the water and swam rapidly to the north shore, after gaining which they could be seen galloping across the plains for miles.

Besides the musk oxen, the Thelon was evidently frequented on both sides by great numbers of caribou, as their tracks were everywhere to be seen, though few of the deer were met with until the lower stretches of the river were reached, their northward migration having preceded us.

Many broods of geese were also observed along the low grassy banks of the Thelon. They were of small gray species, with black necks and heads and white bands around the latter. Later in the season great numbers of moulting geese were met with, and thirty or forty of them were knocked over with sticks for supplying our kettles.

Ducks and ptarmigan were also met with, though not in great numbers, whilst the spruce woods were enlivened by the songs of singing birds, notably American robins.

Bear tracks were twice observed on the banks of the Thelon, and on the return journey Mr. Fairchild was fortunate enough to fall in with and slay Mr. Bruin, after an interesting scrimmage. It was not a black bear, but a small silver gray, or doubtless the barren land grizzly, as reported by Sir John Franklin to have been found by him north of Great Slave lake. Unfortunately, the interesting hide was lost in a canoe accident the day after it was procured.

Upon two occasions moose antlers were found imbedded in the sand of the river bank, and this is an interesting fact, proving the existence of the animals somewhere on the river, possibly higher up, as the antlers might have been carried down by the spring ice. This discovery proves the truth of the report made by the Indians to Sir George Back in 1834, regarding the game on the Thelon, as well as assisting in identifying this river valley as the site of the early and remote but highly-favoured Indian settlement so well described but vaguely located by Samuel Hearne.

In support of Hearne's story, and my belief that his reference was to the valley of the Thelon, it may be noted that some very old choppings were

observed, as well as the decayed moss-grown remains of some very old camps, whilst scarcely any recent signs of habitation exist.

The wooded, or partially wooded, banks of the Thelon, extend for a distance of about one hundred and seventy miles below the forks of the Hanbury. This distance is not to be understood as a continuous stretch of timber, but over that distance many fine spruce groves, as well as more or less continuous thinly-scattered trees are found. The largest trees measured from twelve to fifteen inches in diameter, but the average diameter would be about six inches.

The dimensions of the Thelon are noted from place to place where taken upon the map, but the following may be assumed as approximate averages for the measurements of the river from the confluence of the Hanbury to that of the Doobaunt, a distance of two hundred and twenty-four miles: Width 250 yards, depth 6 feet, current 3 miles per hour.

The depth of the channel in most places measured from 10 to 14 feet, but in a few places sand bars were observed where there were not over three feet of water. Over the entire length of the above stretch of river not a single rapid, worthy of the name, exists. At several points very swift currents were met with, but nothing too heavy to run either down or up with our canoes, for in ascending the river—having a strong, fair breeze—we sailed up through the worst places.

MEETING ESKIMOS

About twenty miles below the last woods on the Thelon, some conspicuous land marks, evidently recently erected by natives, were observed on a high point of the main shore as well as on an island opposite to it. Here the river made a sharp bend to the eastward, and upon following it we noticed the whole atmosphere permeated by an abominable stench, the cause of which was soon explained by the occurrence of the putrifying carcasses of hundreds of dead deer, strewn thickly along both shores for a mile or more. The cause of this unwonted slaughter was not very apparent, but it was thought at first that the poor brutes might have been caught by the spring ice floe and drowned. The subsequent discovery that a few of them were carved and deprived of their choice parts, created the suspicion that it was the work of natives, and the belief was strengthened by the discovery of an Eskimo encampment at the lower end of the string of carcasses. Upon going ashore I made inquiries as to the cause of the fearful slaughter of deer, and was told that it was due to the spring ice, the truth of which, however, I am inclined to doubt.

The encampment consisted of three or four lodges, and thirty-three souls in all, chief amongst whom was an old coast Eskimo, named "Ping-a-wa-look," commonly known by the traders at Fort Churchill as "Cheesecloth." With him, as well as with one or two others our archdeacon was acquainted, and one of them had met me in 1893, so we found ourselves amongst warm friends.

Suspecting that we would be in need of more moccasins on our return journey, I took occasion to order as many pairs as could be made by these people against our coming, and after distributing a few presents of tobacco and ammunition, and taking their photographs, we pushed on down stream a further distance of about twenty-five miles, when a small lake was reached. Upon sailing into it we were suddenly overtaken by a severe gale which obliged us to put to shore and seek a friendly harbour, which we happily found in the nick of time; for we had no sooner got ashore than the surface of the lake was a sheet of foam. Nor did the gale pass as quickly as it had come, but continued the next day and the next. Although we were now beyond the limits of the growing timber we were happily not without fuel, for the little bay in which we had found refuge was filled with drift wood, and knowing such a commodity must soon become scarce, advantage was taken of our enforced detention by baking up a lot of flour, as well as obtaining a set of observations for the determination of our position.

From such determination as well as from my survey, I found ourselves to be no great distance from the confluence of the Doobaunt river, where we had first seen drift wood in 1893, and deeming it inexpedient that our whole party should proceed farther to Hudson bay, over a route which I had already half surveyed, I decided to divide our party here, sending Mr. Fairchild, accompanied by Archdeacon Lofthouse, to complete the survey of Aberdeen, Schultz and Baker lakes, and to resurvey the whole of Chesterfield inlet, whilst I should return up the Thelon and devote my personal attention to the upper part of the river and the divide country.

Acting upon this decision, I prepared the following instructions and handed them to Mr. Fairchild:—

INSTRUCTIONS TO C. C. FAIRCHILD, C.E.

July 13, 1900.

C. C. FAIRCHILD, C.E.,

Slave Lake, Chesterfield Inlet Expedition.

DEAR SIR,—Since in the best interests of the exploratory work we have on hand, it seems advisable that henceforth our party be divided, I hereby transfer to your charge that section of our work extending from the mouth of the Thelon river at Aberdeen lake to Hudson bay.

You will take with you two of our canoes and four men as voyageurs, viz:—Monette, French, Acres and Kipling. Mr. Lofthouse will also accompany you as far as Hudson bay, and assist you with micrometer and other work. He will probably leave you at the coast, but before he does so you will obtain from him his meteorological record and instruments, as well as any natural history specimens he may have, and carefully preserve the same for me.

From the time of his separation from your party you will endeavour to continue until the conclusion of your work the meteorological records with as much regularity as possible.

For the performance of your survey, I commit to your charge the following instruments, viz:—

One dip circle, 1 solar compass with tripod, 1 prismatic compass, 1 micrometer telescope, 1 pair of field glasses, 1 canoe log, 1 chronometer, No. 0850, and 1 aneroid. And as I am personally responsible to the "department" for these instruments, I request that you take every reasonable care of them.

Your method of survey will be as follows:—When practicable your distances will be measured by the canoe log, and your bearings with the prismatic compass. As frequently as possible you will ascertain the magnetic variation by means of your solar, and also latitude and time observations by means of the dip circle. With the same instrument, as frequently as practicable, you will also determine the "dip" and total force. In Chesterfield inlet where the currents may be too swift or variable to admit of the advantageous use of the log, you will measure your distances by means of the micrometer and discs, which in order that the graduation of the scale may correspond to tenths of a mile may be set at a distance of 18:36 feet centres.

With a view to solving the problem of navigation, you will as often as time will permit, ascertain the depths of lakes, rivers and the inlet. As portions of Aberdeen, Schultz and Baker lakes were surveyed by me in 1893, and maps of such works are submitted to you herewith, you will devote your attention chiefly to the unsurveyed shores, whilst in the Chesterfield inlet the whole requires to be surveyed if time permits.

For the support of your party you will have seven weeks provisions to take you to the bay and back to the Hanbury river or west branch of the Thelon, from which point to Fort Reliance you will have ample supplies in the four caches along our route, the location of which you know. In addition to the above supplies you will take two rifles and 300 rounds of ammunition, besides two fish nets and hooks for the purpose of providing your camp with fresh meat and fish.

It is probable that you may reach Hudson bay by the 25th of this month, and if so you will be able to commence your return journey within a day or two. In any case do not leave the coast later than August 1, as it is necessary that you shall reach Fort Reliance by September 15, in order to meet the steamboat which I have engaged to take you and party to Fort Smith. At Reliance or Resolution you will likely receive official instructions addressed to me. If so, you may open and read them and act in accordance with the same.

The cost of transport of our party and outfit, including dogs, to Fort Smith, was agreed upon at (\$100), one hundred dollars. Keep of dogs was to be seven skins each and four nets. These, and any other accounts of our party, you will please certify in my name. I will arrange for the payment of your party at Winnipeg, and in the meantime you will be able to obtain what goods or cash you may require from any of the officers of the Hudson Bay Company.

Such of our goods as were left in cache at Resolution and elsewhere, you will please take out with you or ship to my address at Hamilton, depending upon your facilities for transport. You will also be governed in this regard by instructions you may receive from Ottawa. Herewith I inclose a note addressed to the officers of the Hudson Bay Company, instructing them to supply you with what goods or cash you may require and to charge the same to my account. Please have all accounts made out in triplicate and retain one copy for my use in making a final settlement of accounts.

In regard to your survey of Chesterfield inlet, it is desirable that you should ascertain the range of the tides at various dates and localities, also the direction and rates of tidal currents, the depth of water and nature of bottom at places suitable for anchorage, as these are questions which affect navigation.

Requisition for railway tickets for yourself and party will be supplied you at Edmonton.

Your obedient servant,

J. W. TYRRELL, *D.L.S.*

In response to these instructions Mr. Fairchild assumed charge of the eastern section of our work, and carried it through most successfully.

The following is his own report:—

MR. C. C. FAIRCHILD'S REPORT.

CHIPPEWYAN, November 12, 1900.

J. W. TYRRELL, *D.L.S.*, &c.,

Slave Lake, Chesterfield Expedition.

DEAR SIR,—Acting under instructions from you, bearing date July 13, 1900, I beg leave to report as follows:—

I proceeded from our point of separation with the survey, according to instructions, as far as Hudson bay, where I arrived on July 31, and returning completed the survey on the inlet on August 4.

Owing to the high winds prevailing during the trip, I was unable to make such headway as would warrant a micrometer survey of the inlet, but I tied the traverses of north and south shores together, and also took observations for time and latitude as often as possible.

The magnetic variation on Chesterfield inlet I found very erratic or variable, and no doubt any difficulty in plotting the survey will be due chiefly to this fact.

I was unable, owing to the short time at my disposal to make anything but a cursory examination of the general depths of the water traversed, but I took soundings enough to satisfy myself that vessels drawing 10 feet of water would have no difficulty in travelling from Hudson bay to the west end of Baker lake. Here boat navigation must end as far as the river between Schultz and Baker lakes is concerned, owing to rapids at either end of the river that would in low water not permit of the passage of any craft larger than a York boat.

The south shore of Aberdeen lake we found generally low sandy soil, with a few rocky ridges. The shore was strewn with driftwood for about 30 miles from the west end of the lake; beyond this point not a vestige of driftwood was seen, excepting of willow, which grows along the whole route traversed.

The south shore of Baker lake is also generally low and sandy as far as the point about 20 miles from the east end; here the contour plunges suddenly into bold rocky ridges, similar to the shores of Chesterfield inlet.

Chesterfield inlet in the main channel exceeded five fathoms in depth at all points tried, and soundings were only taken when I could see the bottom, which was plainly visible at 30 feet and even more.

Some difficulty would be experienced at the west end of Baker lake to find a suitable landing place for a vessel of any size, owing to the prevalence of sand bars.

During my return trip I succeeded in killing a bear, which I believe was of the species spoken of by Richardson as the barren land grizzly; however, I do not believe that they abound in any numbers, as we saw only one other track during the entire trip.

I regret exceedingly to have to report that while I regard the trip as highly successful inasfar as I covered all the ground laid out, I had a canoe accident on the Thelon river on my return trip. My canoe was capsized in about 24 feet of water, and while no lives were lost, the solar compass, prismatic compass and camera could not be recovered.

The plans and field notes, which I transmit to you herewith, will give you the information gathered during the trip.

I have the honour to be,

Your obedient servant,

C. C. FAIRCHILD.

UPPER THELON

On the morning of July 16, the gale having subsided sufficiently to admit of travel, Mr. Fairchild, with two canoes and party of five, set off for Hudson bay, whilst I, with the one remaining canoe and two men returned up the Thelon, with the intention of exploring the upper part of the river, and possibly getting through to Lake Athabasca, in which case I might be able to catch the last Hudson's Bay Company steamer going up to the landing, and get out somewhat earlier than Mr. Fairchild. However, this was all uncertain, as it was impossible for me to know what I should be able to do in these regards. At "Ping-a-wa-look's" camp on our way up stream, I procured the few moccasins they had for us, and they were much needed before we got out of the country, for as my men tracked the canoe up stream, the sharp rocks and stones over which they had to walk, cut through two or three pairs of shoes a day.

On July 23, as we were working our way up stream, we overtook a large band of caribou moving southward, and we were highly pleased to meet them,

since we were quite out of meat. Several were shot, and a good supply of venison taken along with us, to be dried at the earliest opportunity.

The weather, which had set in bad about the middle of the month, continued so for two weeks, causing us some delay, and a more unpleasant trip up the river than we would otherwise have had.

In passing some of our former camping places, it was observed that the water of the river had fallen about two feet from its level of two weeks previously.

On the 28th we reached our old camp at the Forks and there remained for a day or two in order to get a rate for my chronometer as well as to dry our meat. These objects having been accomplished on the last day of July, I turned my attention to the upper portion of the Thelon, which was found from the forks up to be obstructed in several places by shallow rapids. The general trend of this part of the river is southerly, and its banks which are more thinly wooded than farther north are comparatively low and sandy with grassy flats at some places—particularly towards Eyeberry lake—about fifty miles up. This lake was so named because of the abundance of eye-berries which we found on its shores and islands. About ten miles above or south of Eyeberry lake, a small river fifty yards wide was observed emptying into the Thelon, and south of it the river banks became suddenly much higher, and the river channel more confined and tortuous.

Spruce and tamarack were also becoming more frequent, though still scanty enough. The average elevation of land was from 50 to 80 feet above the river, which in width varied from 100 to 250 yards, and in depth from two to six feet.

Its mean velocity was about three and one-half miles per hour. Flood water marks here as well as on the lower part of the river were observed as high as thirty feet above ordinary water level.

In August it was observed by Fairchild to be three feet higher.

At about ninety miles the country again becomes more open and prairie like, with low sandy river banks. A few miles further up the banks are composed of coarse gravel, and rise to a height of eighty or ninety feet. The rock formation which makes its appearance at several points along the river banks, was observed to be sandstone, and so on the general character of the river and country continued much the same for a distance of 128 miles, when the stream becomes divided again, and both branches rapid and shallow. At the confluence was also observed the junction of sandstone and granite rocks. It was now August 9, and judging from my progress during the last two weeks, and the prospect of increased difficulties ahead, I came to the conclusion that it would be unwise to attempt to push through to Lake Athabasca—a probable distance of 500 miles further by my route. It seemed to me preferable and more strictly in line with your instructions, that I should rather endeavour to explore a second route across the "Divide" to Artillery lake, and recollecting the small river flowing in from the west at the Sixty mile, I determined to return thus far, ascend it as far as possible and thence cross by the easiest route to Artillery lake.

ACROSS COUNTRY 160 MILES

Having decided upon the above plan of action, we easily returned down stream to my new point of commencement, and on the 13th began to ascend my west branch. Its course took me as nearly as could be in the direction of Artillery lake, but I was not long to follow it, for by noon of the same day we had reached the head of navigation for so heavily loaded a canoe as ours. Not wishing to be thwarted in my object, I now decided to send my two men with the canoe, around by the way we had come, to Artillery lake, and that I would walk across alone.

It seemed that there could be no great difficulty in doing so, for the distance in a straight line I knew to be only about eighty miles; the season was still early and there were now plenty of deer roving over the country. Thus viewing the problem, I sent my men back with the canoe and its contents, and having selected my necessary outfit for the tramp, bundled it up into a neat pack of about fifty pounds and started off. It did not feel heavy at first, and the weather being fine I made fair progress, but as the day wore on, my pack became burdensome and by evening I was quite ready to lay it down and creep into my sleeping bag. This first day's march, which covered thirteen miles, was along the course of the stream, over rough hills of gneiss sparingly wooded for a distance of ten miles only from the Thelon. At a point eight miles distant I discovered a beautiful little fall of 50 feet drop, and it was here that the gneiss formation was first noted. Its strike was observed to be north 15° east (astronomical) and dip 70° east.

My first day's march took me to the shore of a small lake, which of itself formed no serious obstruction to travel, but may be mentioned as the first link of a chain which was to cause trouble. The lake is about four miles long, but of very irregular shape. Its east shore is conspicuous because of a high ridge of white sand which has a bearing of south 63° east. Because of the irregularities of the shore and the impossibility of seeing any great distance ahead, it required a twelve mile tramp to get free from this lake, and that represented my second day's journey. My rations were obtained from the carcass of a deer which I had shot, and some biscuits which I had brought in my pack.

On the morning of my third day, only three miles from my "camp" I came upon a large lake—to which I have taken the liberty of attaching my own name—since I am sure it has never been, and perhaps never will be, of as much interest to any one else as it proved to me.

Ascending the highest convenient hill, I examined the lake as critically as possible with my fine field glasses. Its general bearing lay nearly north-east and southwest. Its southerly shores appeared to be only five or six miles distant; but its northerly boundary I could not determine, being apparently limited only by the blue hazy distant hills. Having no boat or timber of any description with which to make a raft, I turned my steps towards the south, as the seemingly easiest way of getting past this obstacle, and for three miles or thereabouts I got along all right. Then I was suddenly confronted by a large stream forming the outlet of the lake. This I descended for some distance in the hope of finding a ford, but finding none, I stripped myself and waded in, hoping to find some place where I could get my outfit across, but in this I was disappointed, and the water, too, was very cold.

I had no alternative but to return and try the north end of the lake, which I did, and, to make a short story of a long weary tramp, over rocky hills and through soft muskegs, ankle deep in water, after three days of coasting it, I reached the northwest angle of Tyrrell lake, and there was no love lost in parting. I had now been five days on my tramp, but out of a distance of sixty-three miles covered, I had only made sixteen miles westerly out of a necessary eighty; and the contemplation of this was anything but encouraging, for I had counted on reaching Artillery lake within ten days at the longest. There was, however, no possibility of rejoining my canoe now, so my only possible course was to push ahead regardless of what time the journey might take, or what new difficulties it might present.

The character of the country continued much the same, the rounded bare hills of gneiss being separated by wet muskegs, or as commonly, small lakes and ponds which covered a large percentage of the country and formed a great impediment to travel.

The morning of my sixth day set in with a chilling northeast wind and pelting rain, which not only saturated my clothing, but also the moss, so that I could make no fire. Having a small flask of brandy with me, I refreshed myself with a little of it in water and a biscuit, and tramped on, making thirteen miles during the day. The night being dark at this season, it was not possible to travel continuously, so, wet and shivering as I was, I lay down on the rocks in the pelting rain to try and sleep, but this was not to be, for my bed soon became a puddle of water, and I was uncomfortable indeed. I earnestly longed for the daylight, so that I might get up and travel, and at length it came, but still the cold rain came down, so that I could only wring out my single blanket and start on without breakfast. A deer skin which I had carried in addition to my blanket had become so water-soaked as to be too heavy to carry and was left behind. Fortunately by noon on the seventh day, the clouds broke and let the warming sunlight stream through upon me. Thus I was enabled to dry my clothes, and still better, ere long, to make a fire and cook some venison, which was much appreciated. At night as I went into camp (more properly my blanket), I shot a fine fat buck, and cooked as much of it for future use as I could, with the little moss I could find.

The 20th of August was my eighth day out, and I had made only thirty-three miles of westing, but now the weather seemed to have cleared, so I pushed on with fresh courage, passing several small lakes and bringing up on the summit of a hill overlooking a larger one.

Here, observing the approach of a heavy storm, I proceeded to fortify myself as well as my blanket and canvas wrapper would admit of, and so fairly well weathered out a bad night. But the next day was intolerable. I endeavoured to push on, but so cold and drenching was the rain that I shivered even as I travelled, under my watersoaked burden. Later in the day the weather became so thick, that I was as one walking in the dark—not knowing what was before me—and soon found myself almost entirely surrounded by water. I was now forced to await an improvement in the weather, and so, partaking of a wet biscuit, for I had nothing dry, and a drink of brandy, I lay down on the sand.

All night the cold rain came down in torrents, so that I was perfectly saturated with it. As the morning dawned conditions were not improved, for the rain had changed to snow and clothed the landscape in her chilling garment of white. It left me in an extremely uncomfortable condition, to say the least, being without shelter, fire or cooked food, but the worst seemed to have passed, for at eleven o'clock the next day the sunlight broke forth again and brought me much needed relief.

With the clearing weather I found myself to be on a long high point of sand, reaching far out into a lake, from which it would be necessary to retreat and make a detour, but anything was better than lying shivering in the darkness and rain, so I resumed my tramp, or track survey as a real pleasure, and hoped for better days, but they were not to come just yet. I took advantage of all the daylight the 22nd could afford me for travel and made a good day, but the next brought a repetition of the storm, a gale from the northeast, with driving rain and sleet—so severe that I was forced to seek shelter, which to some extent I found on the lee side of a rock. Here I spread my canvas and wrapped my wet blanket about me, remained for two days until the storm of wind, rain and snow had spent its fury. My biscuits were now all gone, and the only available stimulant I had at this camp was the remainder of my flask of brandy, of which I gladly availed myself.

My condition had become decidedly serious. I had not slept a night since I had left my canoe, and this wretched weather and lack of food was already telling seriously upon me. The barren ground is a most inhospitable place in

bad weather, but having exposed myself to its inhospitality there was only one thing for me to do, and that was to get out again as best I could, and this I was quite resolved to do.

The morning of the 25th brought a slight improvement in the state of the weather, so that I was able to get on my feet again and stagger along under my load—made doubly heavy by its weight of water.

By noon the rain ceased entirely, when I was able to make a heather fire and cook some venison which revived me much. The next morning I found a quarter of an inch of new ice on the ponds, but getting under way I soon came to the shore of a very large lake—the one I believe shown by Back on his Indian sketch, and recently named Campbell lake.

Its shores are formed of high white sand ridges, and afforded good travel which was most acceptable to my sore feet and worn out moccasins. The country in the vicinity of Campbell lake presented a less rugged and more pleasing appearance than it had done since leaving Thelon. Berries of several kinds had again made their appearance and deer trails were well defined and deep, although it should be noted that these latter were everywhere to be seen throughout my journey.

Fifteen miles were travelled during the day, chiefly along the shores of Campbell lake, and the next day, my fifteenth out, a similar distance was covered and my first sight of a growing tree obtained since leaving the Thelon valley. There was but a small grove of them, but they meant much to me, not only in administering to my immediate comfort, but as foreshadowing the end of my difficult journey.

Before noon of the following day I had reached my supply cache on the shore of Artillery lake, and completed an uncomfortable tramp of 160 miles.

REUNION OF PARTY

At the "cache" my fish hooks had evidently done effective work, judging from the claw marks on the trees, and the broken condition of several of the hooks. The provisions were found just as I had left them, and I was not long in getting them down and making a snug camp in the spruce grove. My canoe and two men had not yet reached the "cache," but only two days after my arrival they made their appearance with the load in good condition.

A rest of several days was now indulged in, since the weather continued very bad, but it gave me an opportunity to overhaul my outfit, repair moccasins, and pack specimens, etc., for shipment home. On September 4 and 5, I was enabled to complete my unfinished survey of the north end of Artillery lake, and having done so, I left a letter at the mouth of the Casba river for Fairchild, instructing him where to meet me, and turned about to proceed to Fort Reliance.

A head wind springing up, however, I was induced to go ashore until it might moderate, and meanwhile was overtaken by Fairchild, who had received my note within an hour of the time I had posted it up. We were now again a united party, and all in the best of health and spirits.

Mr. Fairchild's report has already been submitted, and there was now nothing left for us to do but get home as quickly as possible. High winds in Artillery lake caused us some delay, but by the evening of September 13 we were all once more encamped at Old Fort Reliance.

RETURNING HOME

As arranged with Mr. Gaudette in the spring, we were met by him in his steamer *Argo* at the old fort on the 15th, and the next day were taken in tow, bound for Forts Resolution and Smith. Unfortunately on the 20th, at Stony island, only twenty-five miles from Resolution, we encountered a gale which drove the *Argo* on to the rocks, smashing her wheel, keel and rudder.

Fortunately no further damage was done, and after effecting temporary repairs, we got her into Resolution on Sunday morning, September 23, three days behind time.

Four more days were then spent in repairing the *Argo* more substantially for her trip up the Slave river to Fort Smith, so that it was late on the 27th before we were again under way.

At Resolution I learned with regret that many of our faithful dogs had died during the summer under the tender (?) care which they had received, but the surviving ones were placed in the canoes and taken with us.

On the evening of the 30th, when about half way to Fort Smith, we were again doomed to misfortune. This time it was our engine that broke down, and one day was lost in repairing it. Besides, our steaming capacity was seriously affected through the accident, so that it was the evening of October 4 when we reached Smith, and the 10th when with our three canoes we sailed up to Chippewyan. Through our unfortunate steamboat experiences we had lost just ten days on my reckoning, and were consequently too late by all accounts to make Athabasca landing by open water.

I decided, therefore, to accept what seemed the inevitable and remain at Chippewyan, where we could obtain supplies and lodgings, until such time as we might be able to proceed with our dogs. This we did, and through the kindness of Mr. Drever, Mr. Fraser, Rev. Mr. Warriek, and others, our stay was made very pleasant indeed. One of my canoes was disposed of to the Hudson's Bay Company, whilst the remaining two were well painted and placed in the company's charge for safe keeping.

By November 14 the lake ice had become set and sufficiently strong to admit of our passage, so with three teams of our own, and two others which I hired to assist us, we set out upon the final stage of our journey, and without entering into details thereof, arrived at Edmonton on December 6, nine months and twenty days from the date we had left there.

SUMMARY NOTES

The more important material results derived from my exploration are briefly as follows:—

1st. The obtaining of a correct topographical map of the routes traversed, in connection with which may be mentioned the discovery of the Thelon river—one of the finest in Canada—navigable for river steamers or other boats of light draught all the way from Hudson bay to the forks of the Hanbury, a distance of 550 miles, excepting perhaps at two rapids on the river above Baker lake, where some improvement to the channel might be made. Just what length of time this route may be open for navigation I am unable to say precisely, but would judge that the river portion must be open at least five months, and the inlet and larger lakes about a month less, i.e., during the months of July, August, September and October.

Thus the possibilities and extent of navigation from Hudson bay towards the west, by way of Chesterfield inlet, have been pretty well determined.

In the Mackenzie basin, Charlton harbour, at the head of Great Slave lake, limits navigation from the west, and on its northern shore by the mouth of the Lockhart river is as pretty a townsite as can be found in Canada. Between these two terminal points the only existing way of communication is by means of the excellent canoe route followed by my party.

For heavy commercial traffic a railway could be constructed without serious engineering difficulties, by avoiding the lakes along the Hanbury river route, there being no great elevations or other great difficulties to overcome, unless it be the remoteness of the district and the scarcity of timber.

Should any kind of electrical transmission become desirable, the two grand water-powers of the Lockhart river and Dickson canyon could be utilized to great advantage during the open season.

Because of the remoteness of the locality, the severity of the climate, the scarcity of timber and high cost of freighting supplies, etc., construction work of any description on the divide must necessarily be expensive; but beyond this, with the information obtainable of so wide a district in one short season, it would be impossible for me to prepare anything like a reliable estimate of the cost of either a steam or electric road.

Besides the discovery of the Thelon as a commercial waterway the resources of its valley should be of great interest, particularly its timber supply and herds of musk oxen, both of which are of great value to Canada.

For the preservation of the musk oxen—which may be so easily slaughtered—and are already rapidly diminishing in numbers, I would suggest that the territory between the Thelon and Back rivers be set apart by the Government as a game preserve.

The chief food supply of the country lies in its great bands of caribou and its fish of various kinds, which are abundant in all the lakes and streams of the district.

The Thelon valley, though affording fine grazing lands for musk oxen and caribou, can scarcely be looked upon as a desirable agricultural district, although I judge from the growth and great variety of plants observed there, that some of our cereals and most of our hardy vegetables could be grown in the Thelon valley.

I regret that the classified list of my collection of plants, which Professor Macoun, of the Geological Survey Department, has kindly undertaken to prepare, is not yet available, but hope that it may be before this report goes to print.

As to mineral products, from what mention has already been made of the rocks, it may readily be judged that the Thelon valley has little to offer.

With the Eskimos, however, many articles, such as arrow heads, spear heads, skinning knives, etc., were observed, which have been beaten into form from native copper, which as they explained to me had been picked up as pebbles from the ground somewhere far to the northward near the salt water.

To this report, for convenience of reference, I am attaching, 1st, a table of distances and elevations; 2nd, a table of information in regard to portages.

Your obedient servant,

J. W. TYRRELL, C.E.,

Dominion Land Surveyor.

APPENDIX No. 1—Elevations and Distances

Place to Place	Elevations	Distances
	Feet	Miles
Edmonton to Lac-la-Biche.....		180
Lac-la-Biche to Fort McMurray.....		255
Fort McMurray to Fort Chippewyan.....		175
Fort Chippewyan to Fort Smith.....		120
Fort Smith to Fort Resolution.....	520	126
Fort Resolution to Fort Reliance.....	520	233
Fort Reliance to Artillery lake.....	1,188	25
Artillery lake to Height of Land.....	1,234	90
Height of Land to Thelon river.....	530	165
Thelon river to Beverly lake.....	133	224
Beverly lake and river.....		35
Aberdeen lake.....	130	55
river.....		21
Schultz lake.....	115	28
river.....		30
Baker lake.....	10	65
river.....		25
Chesterfield inlet.....		130
Edmonton to Hudson bay, via route.....		1,982

APPENDIX No. 2—Portages

Place	Dist. from last Port	Length	Rise or Fall	Side of River
	Miles	Yards		
1st portage from Charlton harbour.....	2½	5,720	R. 570	Left
2nd " " ".....	2½	400	F. 10	
3rd " " ".....	4	100	F. 6	Right
4th " " ".....	6½	1,000	R. 56	
5th " " ".....	3	1,320	R. 122	Left
6th " " ".....	1½	100	R. 29	"
7th " " ".....	1	700	F. 19	Right
8th " " ".....	½	450	F. 75	Left
1st portage on Casba river.....	63	250	R. 15	Right
2nd " " ".....	½	250	R. 4	"
3rd " " ".....	1½	400	R. 5	Left
1st portage out of Clinton-Colden lake.....	23	100	R. 5	
Height of Land portage.....	1½	300	F. 10	
1st portage east of height of land.....	1½	400	F. 20	
2nd " " ".....	8	100	F. 1	Left
3rd " " ".....	½	400	F. 2	"
4th " " ".....	48	500	F. 10	"
5th " " ".....	5	400	F. 30	Right
Portage from Lac-du-Bois.....	5½	1,540	F. 45	"
1st portage on Hanbury river.....	3	880	F. 50	Left
2nd " " ".....	7	100	F. 7	Right
3rd " " ".....	12	50	F. 3	"
Macdonald falls.....	40	500	F. 50	Left
Dickson canyon.....	½	3,520	F. 213	Right
Ford falls.....	1	880	F. 60	"
Helen falls.....	9	500	F. 60	"
10 miles below Dickson canyon.....	1	70	F. 10	Left
		20,930		

Total.....11·8 miles.

